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PC MAGAZINE

THE 60 BEST WORK-FROM-HOME CITIES

DIGITAL EDITION
FEBRUARY 2021

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FEBRUARY 2021

COVER STORY

THE 60 BEST WORK-FROM-HOME CITIES

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WHAT IS C-BAND, AND WHAT DOES IT MEAN FOR THE FUTURE OF 5G?

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CAROL MANGIS

Living the Remote Life

Just about a year ago, it might have seemed like a fantasy: living and working wherever we want, thanks to digital technology. Now, though, that dream is real for many more people, although the reason for it is something none of us would have chosen. A Gartner study in July 2020 found that 80% of employers plan to let their employees work remotely at least part-time after the COVID-19 pandemic, and 47% will let employees work from home full-time.

This is the situation for PCMag's employees: We've all been working remotely since mid-March 2020, and we won't be back in the office until summer at the earliest. Some of us won't be returning at all. Our employers decided remote work was as productive as working in the office for many positions and is allowing some of us to work from home permanently.

Disclosure: I'm one of the people who opted to move away from New York City. I've been based in Pittsburgh since last August. While I miss NYC (and I'll miss it even more when things open up again), I have very few regrets. My commute went from 3 hours a day to the time it takes to walk into my home office space. My family is much closer, and I've truly enjoyed getting to know my nieces and nephews better. The cost of living here is shockingly lower than in the Big Apple, and my apartment is twice as large. And work has been a breeze. Nearly everything I do is doable online; there's nothing more I need here than a computer

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and broadband internet. My colleagues and I joke that we used to Slack one another more than talk to each other in the office anyway, and video calling means I still see their faces often. (I do miss in-person IT, though!)

We suspect a lot of our readers are in similar positions and are thinking about making similar choices. Where to move is a huge decision, and we think you should be as prepared as possible. So we've jumped in to help you focus in on some of the best options in the US and Canada, taking into account broadband speeds, home costs, and other amenities—even coffee shops per capita. You'll be surprised at some of the winners on our list.

Whether you decide to stay where you are or venture to new territory, chances are you'll be doing at least some of your job at home. Check PCMag.com for lots more tips and advice on remote work.

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What Is C-Band, and What Does It Mean for the Future of 5G?

BY SASCHA SEGAN

Photo credit: Alex Potemki/Getty Images

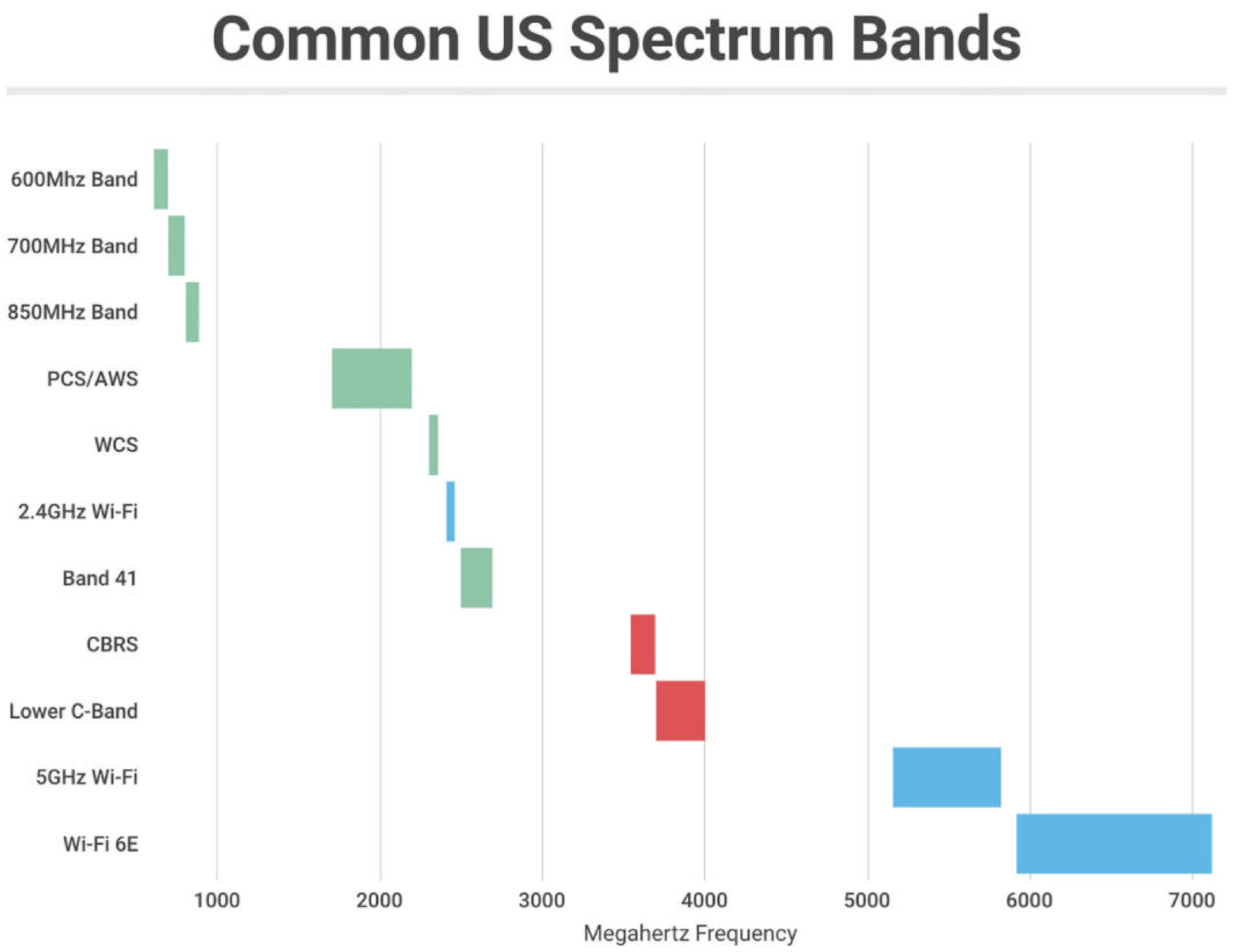
A half-dozen companies are potentially ready to spend $80 billion for C-Band, a new set of airwaves that promise to fix the perilous state of American 5G, at an FCC auction. That's a vast amount of money, and it shows how important C-Band is. But what is C-Band, and what does it mean for 5G? Do you need a C-Band phone? Is C-Band a new frequency? Should you be scared of C-Band? I can explain.

RECOVERING THE SATELLITES

According to wireless testing firm Rohde and Schwarz, the C-band is all frequencies between 4GHz and 8GHz. When US wireless geeks talk about C-Band, though, they're talking about 3.7GHz to 4.2GHz—and specifically, in this case, the range from 3.7GHz to 3.98GHz.

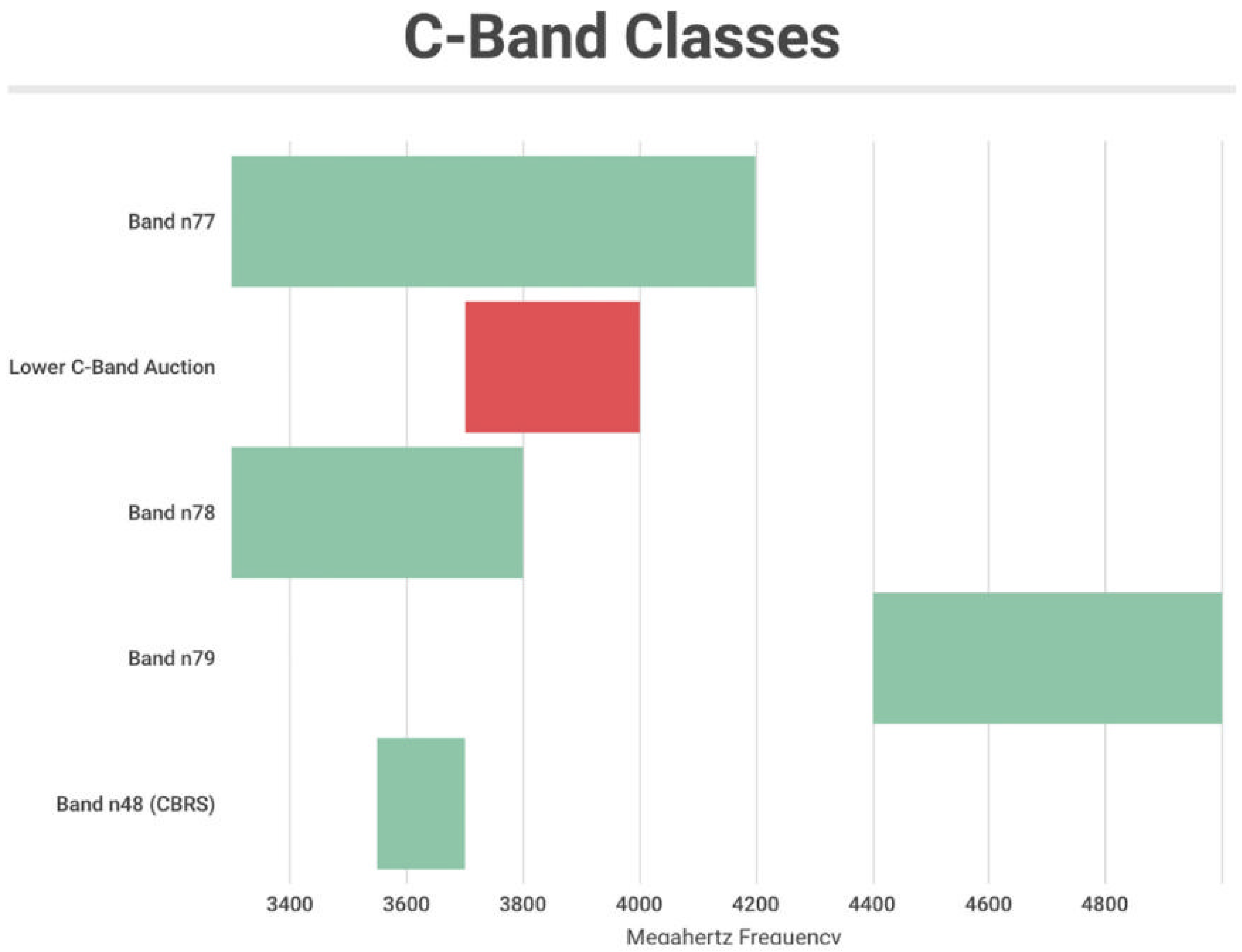
This frequency had been used for satellite TV since the 1970s, but as C-Band satellite reception requires “big, ugly dishes” up to 10 feet in diameter, it was largely replaced by more flexible systems with smaller dishes on the Ku band, such as Dish and DirecTV. C-Band is currently used for the “satellite downlink” for broadcast television distribution.

With more advanced methods of digital encoding than they had in the 1970s, the satellite companies can now “repack” their broadcasts into the upper portion of the C-Band, leaving the lower portion available for cellular companies to use.



The chart above shows the primary wireless carrier user of each band; it does not include minor users.

The C-Band sits between the two Wi-Fi bands, which are at 2.4GHz and 5GHz. It’s slightly above and very similar to the 2.6GHz band that Clearwire and then Sprint used for 4G starting in 2007, and which T-Mobile currently uses for mid-band 5G. And it sits immediately above CBRS, a band from 3.55GHz to 3.7GHz that’s currently being deployed for 4G. So its transmission characteristics are very well known, and its safety is well established.



Most of the rest of the world has started to auction off the C-Band already; in terms of the number of countries, it's probably the most popular 5G band in the world. The International Telecommunication Union (ITU) chopped C-Band up into three chunks: band n77, band n78, and band n79. Most European and Asian countries currently use n78, which stretches from 3.3GHz to 3.8GHz. In the US, we'll use n77, a larger band from 3.3GHz to 4.2GHz. Japan already uses n77, so equipment and phones are out there.

WHY DO WE NEED C-BAND?

The state of 5G in the US is pretty rough right now. For 5G to offer an experience that's noticeably better than 4G, it needs broad, dedicated channels, ideally 50MHz or wider. For 5G to cover entire cities, it needs to be on a frequency below about 6GHz, so it can get decent range from towers. Right now, AT&T and Verizon aren't using any airwaves that fit these bills. Verizon may be able to pull something together using the new CBRS airwaves just below the C-Band, but the jury's still out on that. So by and large, AT&T and Verizon are delivering 5G that's either no faster than LTE would be on the same frequencies or has poor range.

“For 5G to offer an experience that's noticeably better than 4G, it needs broad, dedicated channels.”

C-Band can fix this. The government is auctioning 280MHz of airwaves that are likely to go up to about a half-mile from each tower, so plenty of bandwidth for several different wireless carriers to have solid 5G using mostly existing cell sites.

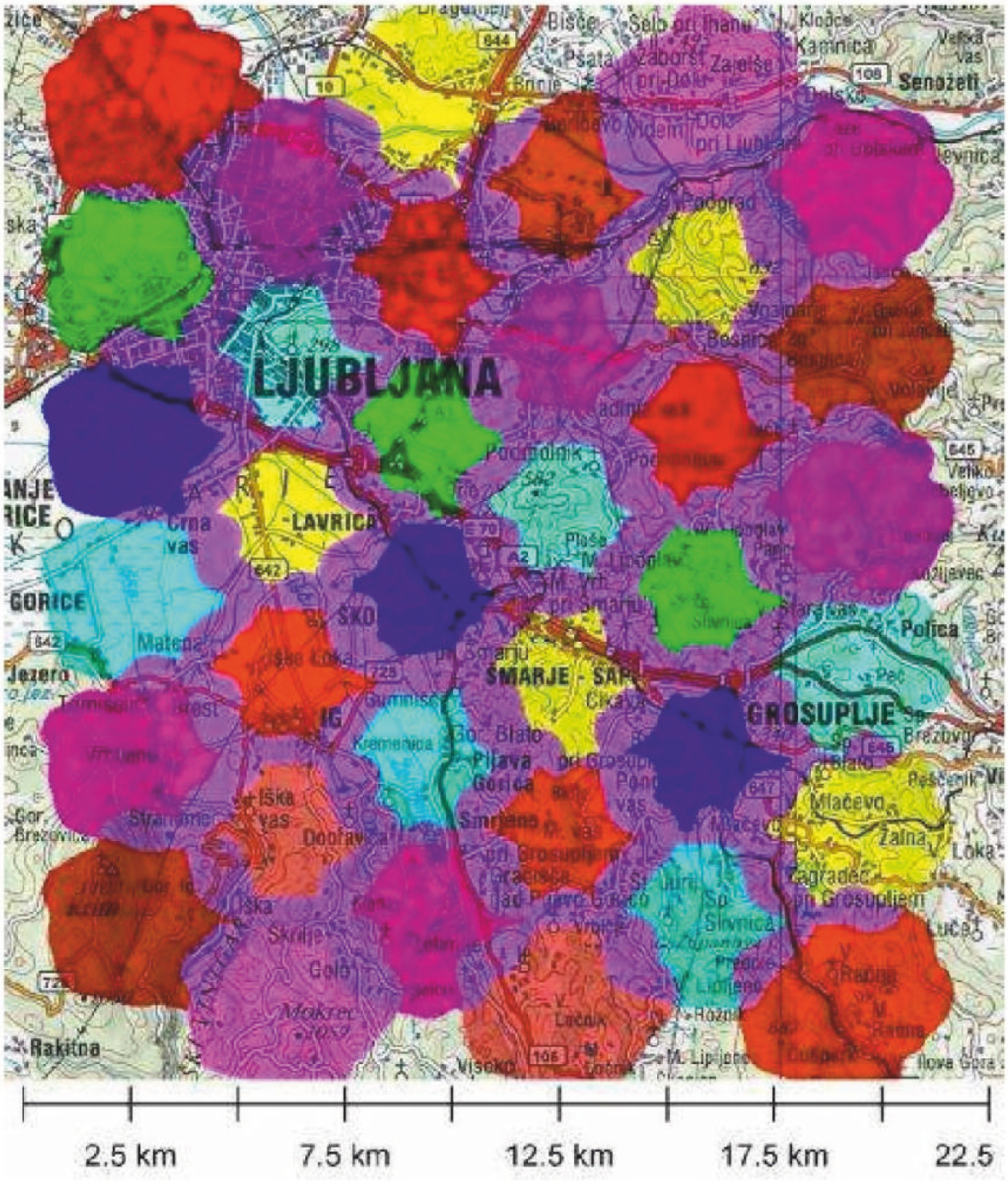


Figure 5. Cell size for urban area, carrier frequency 3.5GHz

An estimate of 3.5GHz cell coverage in the capital of Slovenia.

Cell distance is a tricky thing. A paper from 2006 estimates that 3.5GHz networks can go up to 1.2 miles from each site in an urban area and up to 6.2 miles in a rural area. According to CellMapper.net, there are up to 2.5 miles between T-Mobile's 2.6GHz sites in suburban Dallas, but only 0.6 miles between sites where I live in Queens, New York. So I'm saying a half-mile for the 3.5GHz networks to be safe.

> **"The government is auctioning 280MHz of airwaves that are likely to go up to about a half-mile from each tower."**

WHO WANTS C-BAND?

According to Light Reading, the top C-Band bidders are Verizon, AT&T, Comcast, and Charter (together, in a joint venture), T-Mobile, US Cellular, and Dish. These are all either mobile network providers or cable companies. They've all expressed interest in running their own 5G networks at some point. While the cable companies don't run their own mobile networks yet (they resell service on Verizon's network), they could build their own or lease their spectrum to one of the three major wireless carriers in a partnership.

WHAT PHONES SUPPORT C-BAND?

For a phone to support US C-Band, it needs two components. Its hardware must support it, and it must be approved by the FCC to work on it. If the hardware supports it, but it doesn't yet have FCC approval, the phone's maker can file for a "class 2 change" with the FCC. But phone makers sometimes choose not to file for changes because they cost money; they'd rather just make a newer model and sell that.

There's a bit of a debate whether hardware support means band n77 or n78 appearing on a spec sheet, as parts of the US C-Band fall within n78. If a carrier wins segments only within the n78 group, n78 phones will probably work for them. That could open up a wider range of phones, as more phones currently have n78 than n77.

The iPhone 12 series are the first US phones approved by the FCC for C-Band. The Google Pixel 5 has C-Band on its spec sheet, but it hasn't been approved for use on C-Band by the FCC yet. The same goes for many foreign phones; they may have n77 or n78, but they haven't been cleared for US use on those frequencies by the FCC.

WHEN WILL C-BAND 5G HAPPEN?

The current C-Band auction will run until the bidders don't want to bid anymore, which is likely to be sometime in January or February 2021. The C-Band frequencies are being auctioned off in 14 chunks of 20MHz each. The first five, 100MHz known as the "A block," are the most important (and most expensive), because satellite companies can be paid to clear them for 5G use by the end of 2021. Cellular firms can start building their networks before the frequencies are cleared for use, so we'll likely see the first C-Band systems at the end of 2021 or the beginning of 2022.

The other 180MHz in the C-Band is scheduled to be cleared only by the end of 2023. That would put other networks on a late 2023 or 2024 launch. Those launches may happen earlier in 2023, though, if the precedent from the 600MHz band holds. T-Mobile took a lot of the 600MHz band, which was previously TV channels 14-55, in 2017. That had a clearance schedule that went out to July 2020. But T-Mobile worked with (and paid) broadcasters to clear early, getting New York City cleared more than a year before it was supposed to, for instance.

DO I NEED A C-BAND PHONE?

Right now, deciding whether you need a C-Band phone is about trying to foresee whether your carrier will launch a C-Band network before you get a new phone.

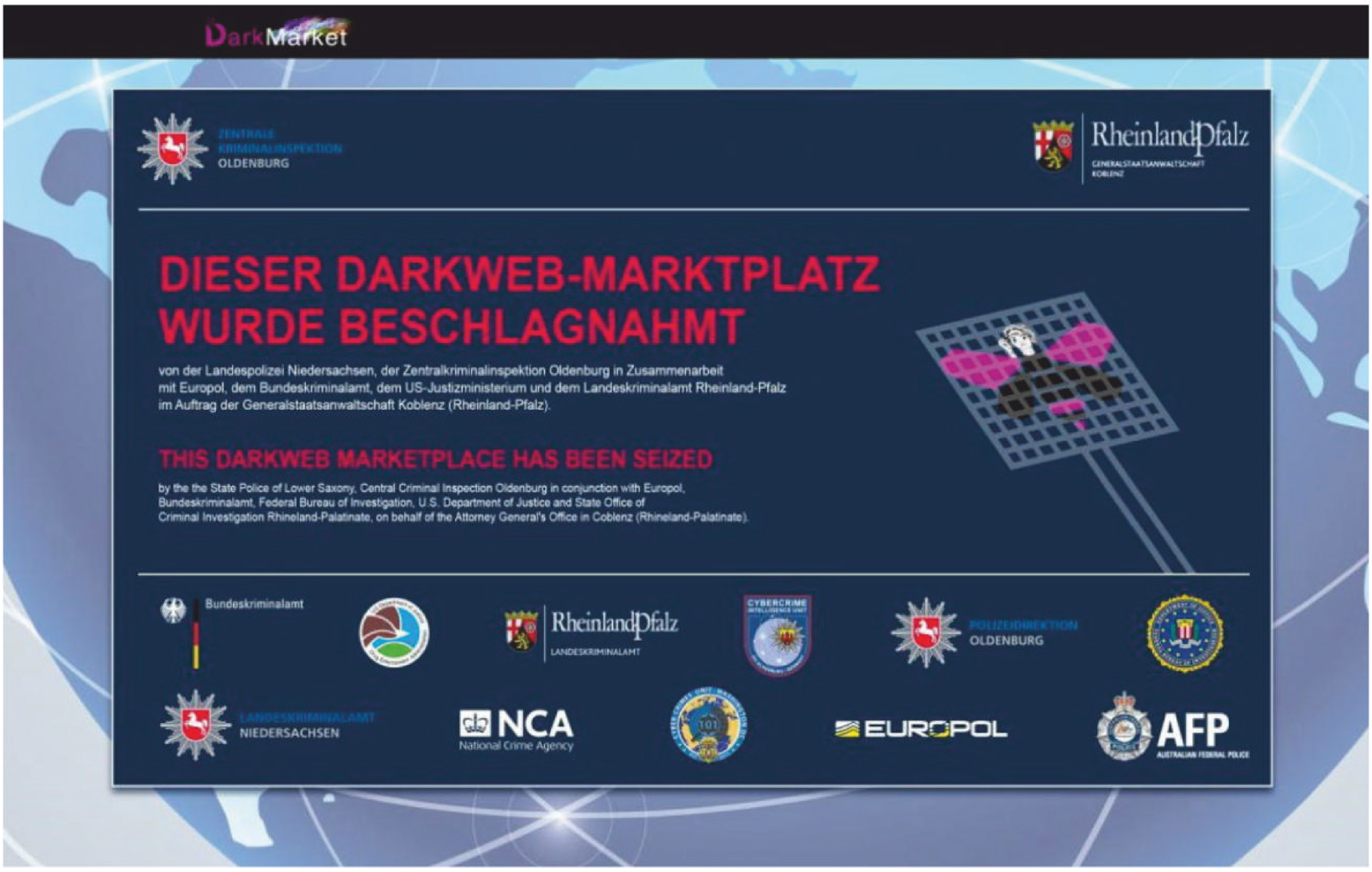
I think Verizon is going in big on C-Band and will have major C-Band launches in late 2021 and early 2022. If you intend to keep a new phone for more than a year, it would help to get a C-Band phone on Verizon.

As for T-Mobile, you don't need C-Band. T-Mobile isn't making a big investment in the frequency. And for AT&T, you don't need C-Band now. I think AT&T will, by and large, go for the later clearing chunks of C-Band, which means you'll want it in your 2024 phone.

> **I think Verizon is going in big on C-Band and will have major C-Band launches in late 2021 and early 2022.**

World's Largest Dark Web Marketplace Taken Offline, Operator Arrested

BY MATTHEW HUMPHRIES


DarkMarket
ZENTRALE KRIMINALINSPEKTION OLDENBURG
Rheinland-Pfalz GENERALSTAATSANWALTSCHAFT KOBLENZ
Bundeskriminalamt
Rheinland-Pfalz LANDESKRIMINALAMT
CYBERCRIME INTELLIGENCE UNIT
POLIZEIDIREKTION OLDENBURG
LANDESKRIMINALAMT NIEDERSACHSEN
NCA National Crime Agency
EUROPOL
AFP AUSTRALIAN FEDERAL POLICE

DIESER DARKWEB-MARKTPLATZ WURDE BESCHLAGNAHMT

von der Landespolizei Niedersachsen, der Zentralkriminalinspektion Oldenburg in Zusammenarbeit mit Europol, dem Bundeskriminalamt, dem US-Justizministerium und dem Landeskriminalamt Rheinland-Pfalz im Auftrag der Generalstaatsanwaltschaft Koblenz (Rheinland-Pfalz).

THIS DARKWEB MARKETPLACE HAS BEEN SEIZED

by the the State Police of Lower Saxony, Central Criminal Inspection Oldenburg in conjunction with Europol, Bundeskriminalamt, Federal Bureau of Investigation, U.S. Department of Justice and State Office of Criminal Investigation Rhineland-Palatinate, on behalf of the Attorney General's Office in Coblenz (Rhineland-Palatinate).

The most notorious dark-web marketplace, Silk Road, was forcibly shut down in 2013. Now, an international operation has managed to take down what was the world's largest active dark-web marketplace and arrested the individual who ran it.

As Europol reports, the marketplace in question, called DarkMarket, consisted of almost 500,000 users and over 2,400 sellers, and it handled over 320,000 transactions. In total, it's thought DarkMarket saw over $170 million change hands in the form of Bitcoin and Monero cryptocurrencies (over 4,650 bitcoin and 12,800 monero).

The marketplace was taken offline thanks to a joint operation involving Germany, Australia, Denmark, Moldova, Ukraine, the United Kingdom (the National Crime Agency), and the USA (DEA, FBI, and IRS). The investigation was led by the Koblenz Public Prosecutor's Office, which discovered the 20-plus servers located in Moldova and Ukraine used to run DarkMarket. They have since been shut down, but not before investigators collected all the data they contained for further investigation, with a particular focus on the moderators who worked for the marketplace.

> **A 34-year-old Australian citizen who is thought to be the operator of DarkMarket has been arrested.**

As *The Guardian* reports, a 34-year-old Australian citizen who is thought to be the operator of DarkMarket has been arrested by the Central Criminal Investigation Department in the German city of Oldenburg. His arrest, combined with the data gathered from the seized servers, makes it likely other arrests and prosecutions will be forthcoming as moderators are identified and tracked down.

In November last year, the US government seized over $1 billion in Bitcoin, claiming the funds once belonged to the notorious dark-web marketplace Silk Road. Although much smaller in scale, cryptocurrency transactions carried out on DarkMarket may also end up being seized as part of the investigation.

Chandra Steele

COMMENTARY

Storming the Capitol Started on Social Media, and It Should Have Ended There

PCMag Senior Features Editor Chandra Steele got her tech journalism start at CMP/United Business Media. She also writes fiction and has been published in McSweeney's Internet Tendency.

It took an armed insurrection on the US Capitol for Facebook and Twitter to try to quiet the incendiary words of President Donald Trump on their sites.

For years, execs at both companies have been asked what it would take—perhaps a call to nuclear war?—to ban Trump from their platforms. The answer came two weeks before his time as president ran out. But as the literal smoke cleared, social media had yet to take steps to stop those who planned the action and potential future ones.

Those who stormed the Capitol spent weeks on Facebook, Twitter, and other social media platforms calling their comrades to arms. Plans for January 6, 2021, were known about so far in advance that it was already emblazoned on the merch rioters wore as they tore apart Senate offices. "Be there, will be wild," Trump himself tweeted.

Calls to sedition used to be printed on flyers and leaflets that were nearly impossible to trace. Now, instead of being samizdat, they're shared on social media. Richard Barnett, who broke into House Speaker Nancy Pelosi's office and stole mail from her desk, used Facebook to urge people to DC on Jan. 6. "This is OUR COUNTRY!!! Can you give one day from the Internet or work or whatever to be active. Get the f--- up people. Please STAND!!! If not now, when?" he wrote, according to *The Washington Post*.

In response to mild restrictions on speech that ran afoul of mainstream social media platforms' policies, alt-right alternatives like Gab, Parler, and TheDonald.win have taken up the mantle of hate speech. But there is also enough venomous spew to fill Facebook groups and proliferate on Twitter, despite daily calls for Jack Dorsey to "ban the Nazis."

The attack on the Capitol should serve as a wake-up call for many things, but particularly for the aid social media has given to hate movements in the United States and elsewhere. Banning one individual, even when he's the President, is not enough.

The failure of tech CEOs to take action resulted in people wearing "Camp Auschwitz" hoodies, breaking into the Capitol, and parading through its halls carrying Confederate flags. Those images are the IRL culmination of what has passed for discourse on social media for far too long. Only after the events of January 6 did Facebook remove posts with #stormthecapitol, a hashtag you could still find all over Twitter as I wrote this.

Social media comes with social responsibility, and those in charge of these platforms have abdicated theirs. While terrorists use these sites for things like plotting the kidnapping of Michigan's governor, CEOs spin stories and place the blame (and sometimes praise) on the artificial intelligence tasked with monitoring terms-of-service violations. It is well past time for them to come to terms with what this has wrought on humanity.

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Will Greenwald

Affordable 8K TVs Are Coming, But You Shouldn’t Buy One

We saw lots of new 8K TVs at CES in January, with some coming from vendors known for making affordable models, such as TCL. That means 2021 is likely to be the year we start seeing 8K TVs hit the market at prices that far more people can realistically consider—we’re talking under five digits! Don’t freak out about replacing your still-new 4K TV just yet, though.

8K AT CES

TCL’s announcement that its 2021 6-Series TVs will be entirely 8K is one of the more notable pieces of news from this year’s show, as the 6-Series has long been a PCMag favorite for offering high quality at a reasonable price. That said, TCL hasn’t yet announced pricing for its 6-Series TVs, and it noted that 2020 models will still be available this year, which means the new 8K models can be more expensive than we’re used to seeing from the Chinese manufacturer.

LG and Samsung, meanwhile, have been offering 8K TVs at the very high end for a couple of years, and those selections are set to expand with CES 2021 line reveals. They’ll be joined by other companies, such as Sony.

Will Greenwald has been covering consumer technology for a decade and has served on the editorial staffs of CNET.com, Sound & Vision, and Maximum PC.

So no matter your budget, an 8K TV is likely within your reach this year. But that doesn't change the fact that there is very little reason to buy one.

THERE'S STILL NOTHING TO WATCH

We have 8K TVs. We have the connection standard for connecting those 8K TVs to 8K sources (HDMI 2.1, which supports 8K at 60 frames per second). We're just missing actual 8K content.

All major commercial streaming and physical video media tops out at 4K. If you want to watch a new movie or TV show on a service like Netflix or HBO Max, the most you'll be getting is 4K (hopefully with HDR). If you want to stick to discs, 4K is still the maximum because that's the limit of Ultra HD Blu-rays. You can find some 8K nature content on YouTube, but that's about it. 8K is securely in the "show-off documentary B-roll" phase of commercial content.

Of course, you can shoot your own 8K videos with high-end phones and cameras, but do you really want to spend lots of money on 8K just for home movies? And don't forget that to actually edit 8K content, you need a lot of processing power.

THERE'S LITTLE TO PLAY

And that brings us to video games. The PlayStation 5 and Xbox Series X are both available, and in theory, they should be able to push 8K resolutions.

Technical capability doesn't translate to performance, though, and even now, 4K games on those systems tend to force you to choose between a smooth frame rate and lots of graphical features. I'll believe the current generation of consoles can output native 8K games when I see it, and I'll be counting the frames when I do.

Of course, PCs are much more powerful, especially with Nvidia's new RTX 30-series graphics cards. Again, the potential for 8K gaming is there. And again, stable frame rates balanced against graphical effects mean that 8K resolution will be pushing the limits of even the beefiest gaming PCs. And in most cases, a smooth frame rate at a lower resolution is far preferable to stuttering and inconsistent performance at a higher resolution.

So where does that leave 8K? Upconversion, and that's about it. 8K TVs will upconvert the vast majority of content they receive, meaning 4K and 1080p signals, to 8K using image processing that pumps up the resolution and algorithmically fills in the gaps. That upconversion can be impressive, but it simply isn't as good as native-resolution content. The filled-in details are estimates, and fundamentally aren't as sharp, clean, or real as native video. Without an 8K signal, whether it's streaming video, a movie on a disc, or a game running on a computer, you won't get the full benefit of 8K resolution.

KEEP WAITING

Just because you can get an affordable 8K TV in 2021 doesn't mean you should. There are still big holes in the 8K ecosystem that need to be filled in to make it worthwhile for consumers. We're getting there, but until we hear about Netflix and other streaming services offering 8K videos, or an 8K disc format being finalized, or new video games running at 8K with stable frame rates, there just isn't anything to watch or play at that resolution.

So don't worry about 8K just yet. Enjoy 4K while we see how the content side of the 8K equation fills out. We might have seen plenty of new 8K TVs at CES this year, but let's wait to see what next year's show brings.

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Chris Stobing

COMMENTARY

Intel and Board Partners Tip Z590 Motherboards: Will They Be Worth the Upgrade?

PCMag Hardware Analyst Chris Stobing tests and reviews consumer gadgets and PC hardware, including laptops, monitors, storage, and networking equipment.

At CES 2021 in January, slightly under the radar, Asus and other major motherboard makers announced their lineups of new Intel Z590 motherboards that would launch on January 27. That's well ahead of Intel's upcoming 11th Gen Core "Rocket Lake-S" desktop CPUs, which are slated for shelves sometime in March. Asus wasn't the first board maker to officially acknowledge the existence of Z590 boards (that honor goes to Gigabyte). But now that Intel has pulled back the curtain on Rocket Lake, manufacturers are free to follow suit with their own corresponding announcements.

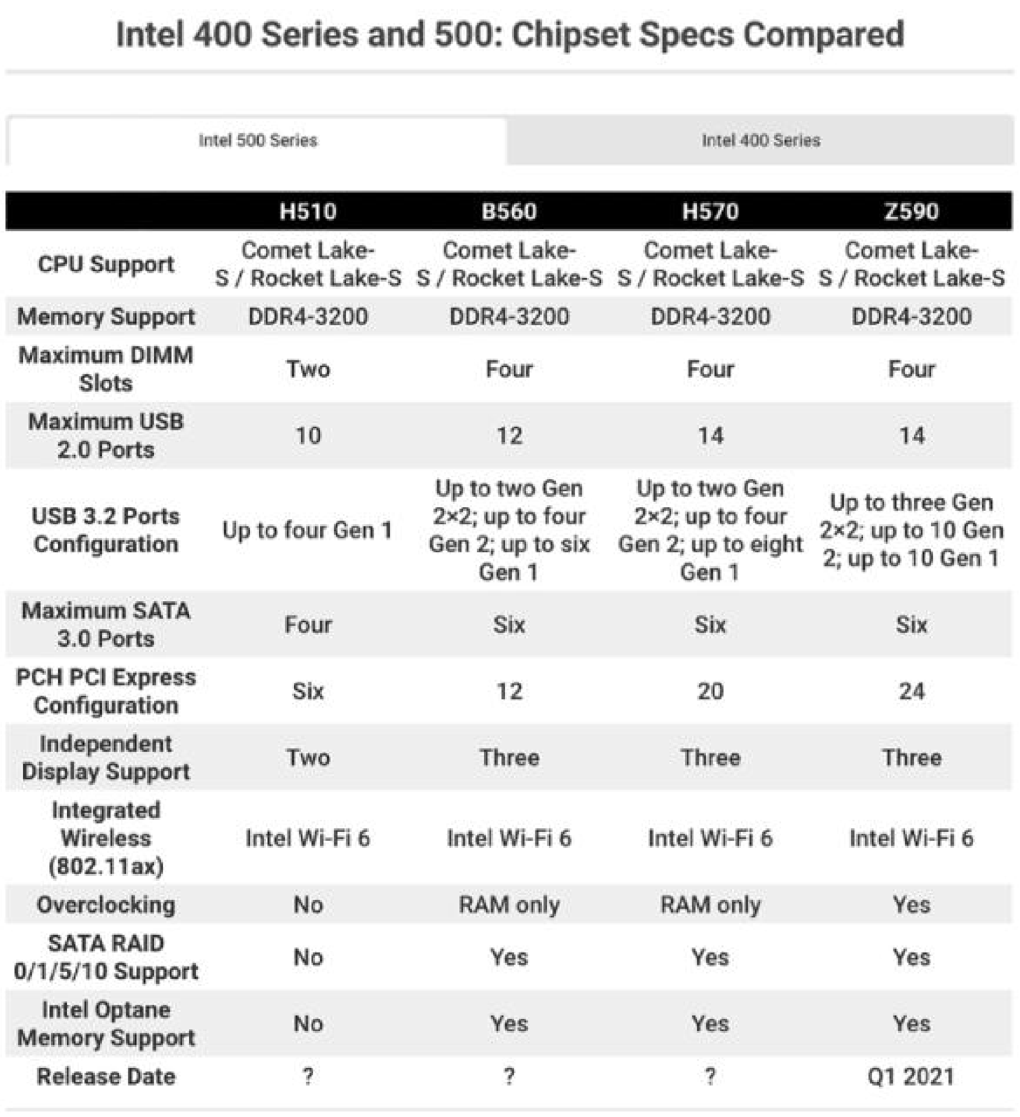
But what is Z590 exactly, and what improvements does it promise over the Z490 platform (which launched a mere 10 months ago)? Is it a must-have for leading-edge gamers and content creators or just another minor upgrade for Intel, which finds itself in a pitched, relentless battle with AMD and its long-running Socket AM4-compatible motherboards?

FROM Z490 TO Z590: AN EVOLUTIONARY STEP UP

One sticking point during Intel's launch of its 10th Generation Core ("Comet Lake-S") chips last year was the upgrade to the Z490 platform, which, while capable of supporting PCI Express 4.0 in theory, has thus far only utilized PCI Express 3.0 in practice. (At the time of launch, some motherboard vendors tagged some of their Z490 boards as PCI Express 4.0 “ready”; what that will mean, once the actual 11th Generation Core chips hit, remains to be seen.)

PCI Express 4.0, at the moment, is mainly of interest to folks deploying the latest high-speed SSDs. The new Z590 platform will bake that in, bringing with it a host of improvements, including support for 16 available PCI Express 4.0 lanes, as well as DDR4-3200 (up from a limit of DDR4-2933 on Z490) as a standard memory speed. The boards will also throw in support for both Thunderbolt 4 and Wi-Fi 6, while certain models will look forward with support for USB 4 and the cutting-edge Wi-Fi 6E.

Also out in the open now are specs for the “lesser” 500 series chipsets below Z590. For some more granular detail, let’s look at how the recent Intel chipsets shape up against one another:


Intel 500 Series
Intel 400 Series

Intel 400 Series and 500: Chipset Specs Compared

	H510	B560	H570	Z590
CPU Support	Comet Lake-S / Rocket Lake-S	Comet Lake-S / Rocket Lake-S	Comet Lake-S / Rocket Lake-S	Comet Lake-S / Rocket Lake-S
Memory Support	DDR4-3200	DDR4-3200	DDR4-3200	DDR4-3200
Maximum DIMM Slots	Two	Four	Four	Four
Maximum USB 2.0 Ports	10	12	14	14
USB 3.2 Ports Configuration	Up to four Gen 1	Up to two Gen 2×2; up to four Gen 2; up to six Gen 1	Up to two Gen 2×2; up to four Gen 2; up to eight Gen 1	Up to three Gen 2×2; up to 10 Gen 2; up to 10 Gen 1
Maximum SATA 3.0 Ports	Four	Six	Six	Six
PCH PCI Express Configuration	Six	12	20	24
Independent Display Support	Two	Three	Three	Three
Integrated Wireless (802.11ax)	Intel Wi-Fi 6	Intel Wi-Fi 6	Intel Wi-Fi 6	Intel Wi-Fi 6
Overclocking	No	RAM only	RAM only	Yes
SATA RAID 0/1/5/10 Support	No	Yes	Yes	Yes
Intel Optane Memory Support	No	Yes	Yes	Yes
Release Date	?	?	?	Q1 2021

As you can see above, on the whole, many of the improvements from Z490 to Z590 are incremental, and they represent one of the shorter leaps in technology that Intel has taken between chipsets in some time.

We don’t know a whole lot about the Intel Core i9-11900K, aside from the little morsels Intel let drop at its CES 2021 presentation (or about the rest of the 11th Generation stack, for that matter; the Core i9-11900K was the only Rocket Lake chip model that Intel identified by name). According to a report from Anandtech, both Z490 and Z590 chipsets will support the 10th Generation Comet Lake-S and 11th Generation Rocket Lake-S chip families. Things gets a bit stickier as you go down the line of the 400 Series chipsets, though, with support for Rocket Lake dropping off with B460 and H410 motherboards, while anyone on H470, Q470, or Z490 will need to update their motherboard BIOS to use an 11th Generation chip on the platform.

“The usual major makers (Asus, Gigabyte, MSI, Asrock) released details about their respective offerings.”

The predictable array of Z590 motherboards hit the wires later in January: The usual major makers (Asus, Gigabyte, MSI, Asrock) released details about their respective offerings coming down the pipeline. Board makers such as Asus have gone the extra mile with some of their features, with one flagship board (Asus Maximus XIII Extreme Glacial Z590) adding an internal liquid-cooling block covering the entirety of the chipset elements and hot-running board bits like VRMs. The radical design makes it easier than ever for overclockers to get the absolute maximum amount of power and thermal regulation out of their systems, while also giving chips like the Core i9-11900K the kind of cooling they'll need to perform at their best if overclocked. Other makers are also pouring on the high-end features in their established top-end series, with MSI offering Godlike and Ace models, and Asrock its usual Taichi. Of course, lesser and less costly Z590 boards are also in the offing.

If you're upgrading from, say, an already top-end Z390 or Z290 board from a few years back, Z590 in extreme boards such as the Maximus XIII Glacial or MSI MEG Z590 Godlike are probably the next logical step in a top-tier performance arsenal. But many folks who just bought a Z490 board will find themselves perfectly OK with the tech they already have, and the cost of upgrading to Z590 will just be too much to justify the minimal feature gains that something like a boosted VRM or slightly upticked Wi-Fi, USB, and Thunderbolt features might offer.

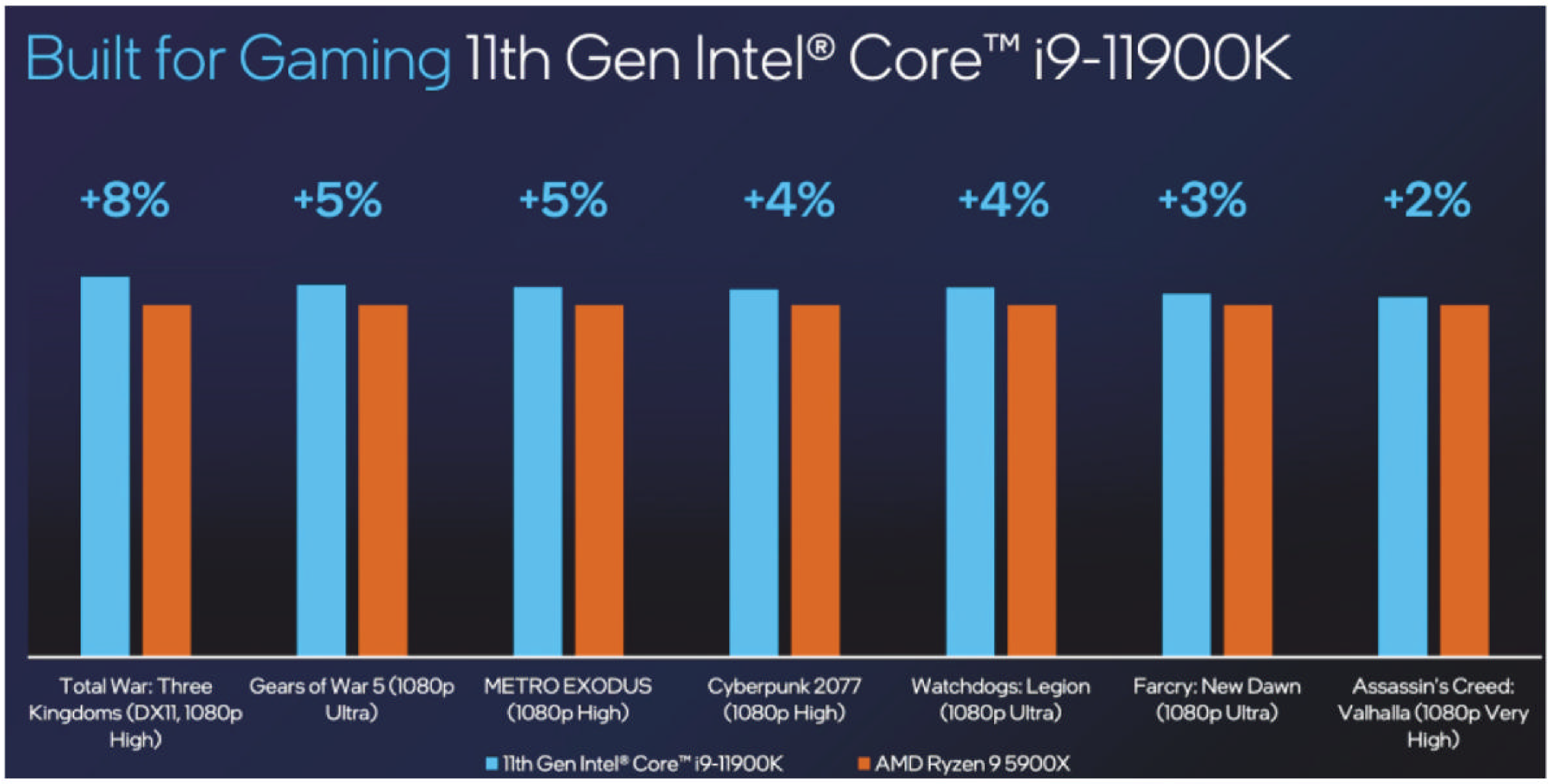
But even with all these new features and tech being announced as a part of the Z590 launch, and the new buzz surrounding Intel's coming top-end chips, we must always come back to question of AMD—and, specifically, the company's AM4 Socket.

WILL Z590 MAKE AMD BLINK?

AMD continues to grandfather in as many motherboards as it can to the consumer-level Ryzen family of CPUs, and Intel asking potential buyers to pony up for yet another motherboard upgrade seems untenable by comparison unless you're upgrading from several generations back. Socket AM4 and its surrounding, successive chipsets have held strong as one of the most flexible desktop platforms that AMD has ever released, with reasonable compatibility stretching all the way back to B350, up to the current generation of X570 motherboards.

That level of compatibility is important when discussing the prospect of how much your next system upgrade might cost, and while an older AMD chipset like the B350 may not have universal support for all the latest USB protocols, raw spec bumps aren't everything in the world of most PC owners. Desktop PC buyers fall into many different categories, but one of the most populous is the "upgrader" class. This is a category of PC owners who, rather than purchasing a brand new desktop every time there's a product refresh, are more likely to tack newer parts onto aging motherboards in order to squeeze out as much value over the years as they can.

Intel did flash a few "Rocket Lake" benchmarks during its CES presentation, which showed some select games running faster on an Intel Core i9-11900K than an AMD Ryzen 9 5900X, by a couple of percentage points.



Now mind you, citing Intel's own numbers, even in titles that favor Intel, the most players can expect is just a 4% difference in games such as Far Cry: New Dawn. Suddenly, the cost of upgrading to a Z590 motherboard and an Intel Core i9-11900K doesn't look so good when a bleeding-edge CPU like the Ryzen 9 5900X can slot into a B450 board, if need be (pending, perhaps, a BIOS update at most).

For PC builders and upgraders who are watching every dollar in their Amazon, Microcenter, or Newegg shopping carts, the Z590 may seem largely overkill. The launch of Z590 is promising some of the boldest designs we've seen in motherboards yet. (Take the Maximus XIII Extreme Glacial as Exhibit A.) But the added price of upgrading to Z590 from Z490 won't likely translate to performance that outdoes the Ryzen 5000 Series in a big enough way to motivate most buyers who aren't upgrading from something old and ditching all their supporting components.

> **Even in titles that favor Intel, the most players can expect is a 4% difference in games such as Far Cry: New Dawn.**

If the Core i9-11900K, the Z590 chipset, and imperceptibly better frame rates on Gears of War 5 at 1080p are the best Intel can do right now, AMD is about to drag out a long winter for the company even further. With AMD doing most of what Intel can in the mainstream enthusiast space faster or cheaper, even the most innovatively cooled motherboards don't look like they'll change the larger balance of that equation in early '21. That said, we're looking forward to putting Rocket Lake silicon to the test and seeing how it shapes up.

chris_stobing@pcmag.com

Starts at $299 | **Rating:** ●●●◐○ **GOOD**

Oura Ring: A New Kind of Fitness Tracker

Fitness trackers have become a lot more attractive over the years, but no matter the design, they tend to stand out. If you're looking for a more discreet alternative that's comfortable to wear 24/7, you might be interested in the Oura Ring. It looks like jewelry at a glance, but the Oura is far smarter than your average ring. This water-resistant wearable features heart rate, respiration, and body temperature sensors, as well as a 3D accelerometer to measure your activity, sleep, and recovery, and it works with a companion app to help make sense of your data and offer insights to foster healthy habits. The Oura's ability to track workouts is pretty basic compared with a wrist-worn model, but it offers comprehensive sleep tracking and is more comfortable to wear to bed than a watch or wristband, making it an intriguing alternative.

PICKING THE PERFECT RING

The Oura ranges in price from $299 to $999, depending on the finish you select. All models feature the same technology and are made of lightweight titanium with a scratch-resistant diamond-like carbon coating (DLC) on the outside and non-allergic seamless inner molding.

You can choose between two styles: Balance, which comes to a point at the top, and Heritage, which flattens at the top. Both styles are available with either a shiny-black or silver finish for $299. For $100 more, you can get the Heritage ring with a matte-black or yellow-gold-tone finish.

If you like a little bling, the company offers a silver Balance model with five round-cut inset diamonds for $999. Set by an expert goldsmith in Finland, each diamond is 0.005 carats, with a clarity grade of IF-VVS and a color grade of D-F.

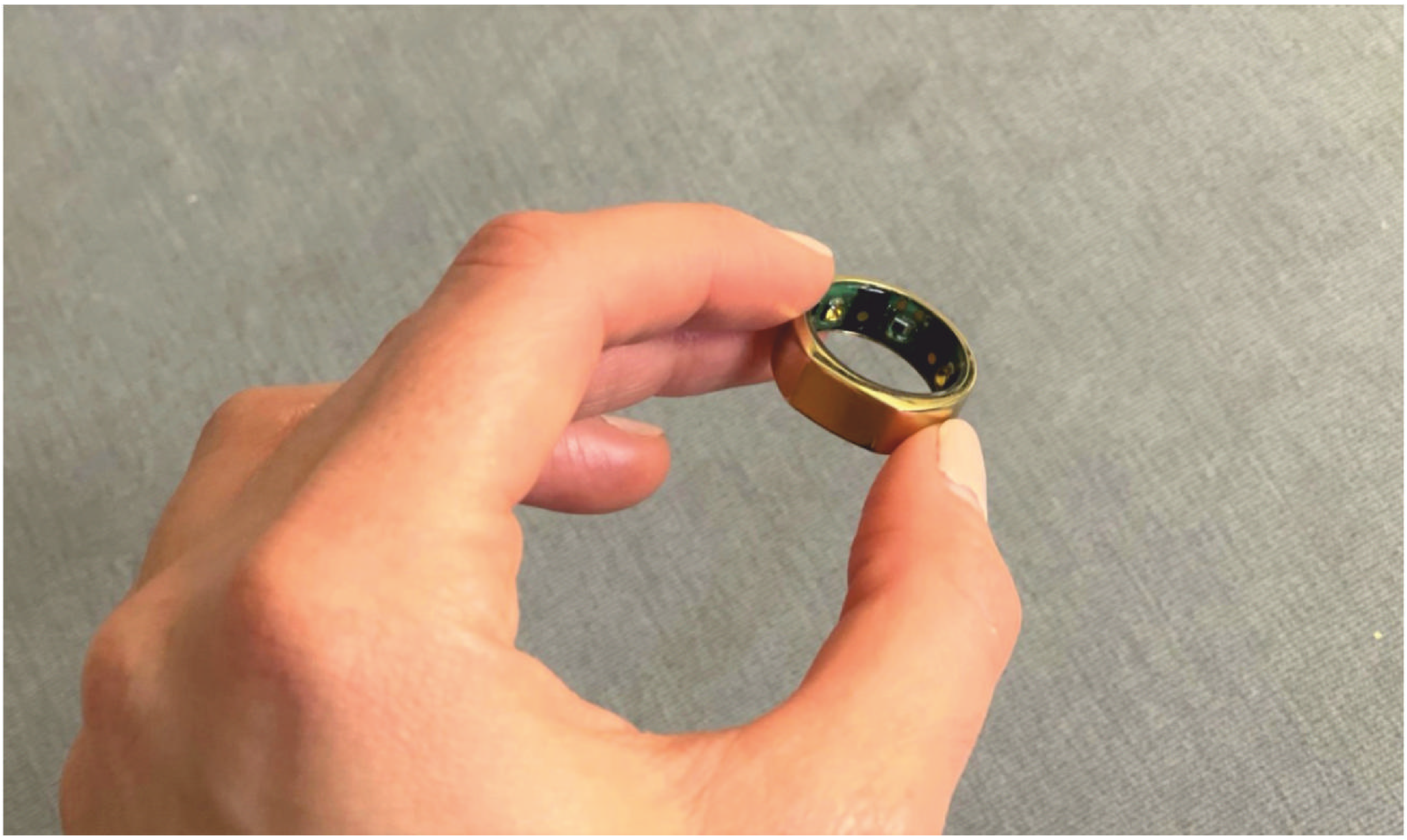
For this review, Oura sent me the Heritage in yellow.

Oura Ring

PROS Discreet, water-resistant design. Comprehensive sleep monitoring features. Tracks body temperature, calories burned, heart rate, respiration trends, and steps. Excellent companion app. Long battery life.

CONS Expensive. Build quality feels cheap. Bulky on small hands. Unimpressive workout tracking.

BOTTOM LINE The Oura Ring is a discreet, finger-based health tracker that can help you keep tabs on your activity level, sleep, and general well-being.



AVAXHOME -

the biggest Internet portal, providing you various content: brand new books, trending movies, fresh magazines, hot games, recent software, latest music releases.

Unlimited satisfaction one low price
Cheap constant access to piping hot media
Protect your downloadings from Big brother
Safer, than torrent-trackers

18 years of seamless operation and our users' satisfaction

All languages
Brand new content
One site

AVXLIVE.ICU

AvaxHome - Your End Place

We have everything for all of your needs. Just open https://avxlive.icu

The ring comes in sizes 6 through 13. You can wear it on any finger on either hand, but Oura says the index, middle, or ring fingers usually work best. When placing your order, you can either choose your ring size right away or have the company send you a free sizing kit. Oura highly recommends using its sizing kit, so I went that route. After trying the options in the kit, I decided to go with a size 8, which fits my middle finger, pointer, and thumb, so I can move the ring around for comfort if necessary. After you confirm your size on Oura's site, the ring should arrive within two to six business days.

At the risk of stating the obvious, one of the Oura's biggest draws is its minimal, sleek design. If you're in the market for a wearable health tracker that doesn't look like one, this is an excellent option, and it's one of the few smart rings on the market right now. We've covered smart jewelry in the past, including the Motiv Ring and Ringly, but neither are available as of this writing. Amazon's unsightly Echo Loop smart ring has been discontinued as well.

The Oura measures 0.3 inch wide, 0.1 inch thick, and weighs 0.14 to 0.21 ounces, depending on your size. When I took my test Oura out of the box for the first time, I was taken aback by how light it is; I was expecting it to be weightier, like an actual gold ring, but it feels more like a toy from a Cracker Jack box. It looks a bit bulky on my finger, and the Heritage style's flat top is slightly reminiscent of a metal bolt. I'm nitpicking, but for the price, I expected it to feel a bit more like real jewelry.

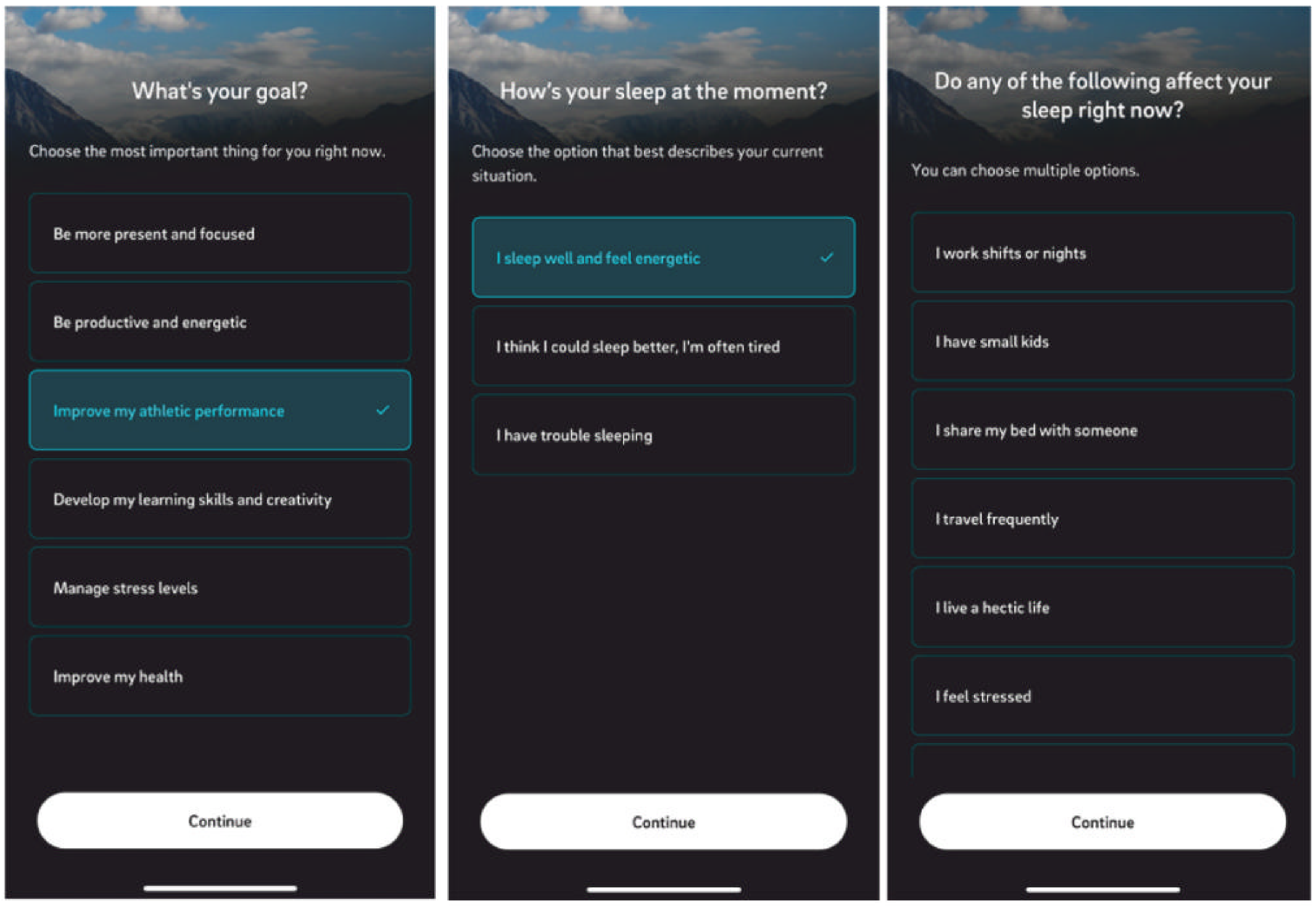
The ring is water-resistant to 328 feet, so it's safe to wear in the shower, bath, or pool. It features a rechargeable battery that allows for five to seven days of power on a charge, depending on your sleep and activity. When it's running low on juice, the app notifies you. You can view your ring's battery level at any time by pressing a circle in the top-right corner of the app.

In testing, the Oura lasted for five days before its battery dwindled to 24 percent and the app told me to charge it. It comes with a black aluminum charger that powers the ring back up in 80 minutes or less. A light on the charger pulses when the ring is charging and turns solid when it's fully charged.

SETTING UP THE OURA RING

To get started, simply download the Oura app (for Android or iOS), create an account, and agree to the terms of use and privacy policy. The app then instructs you to place the ring on its charger, make sure your phone is connected to Bluetooth, and press Continue. When it finds the ring, press Connect, accept the Bluetooth pairing request, and allow or deny phone notifications. It then asks whether you want to connect your account to Apple Health or Google Fit to sync tracked workouts to the Oura app.

Next, the Oura app has you enter your birthday, height, weight, and gender and select your preferred units (metric or imperial). I connected my Apple Health account to the app, which filled this information in automatically.



What's your goal?

Choose the most important thing for you right now.

- Be more present and focused
- Be productive and energetic
- Improve my athletic performance ✓
- Develop my learning skills and creativity
- Manage stress levels
- Improve my health

Continue

How's your sleep at the moment?

Choose the option that best describes your current situation.

- I sleep well and feel energetic ✓
- I think I could sleep better, I'm often tired
- I have trouble sleeping

Continue

Do any of the following affect your sleep right now?

You can choose multiple options.

- I work shifts or nights
- I have small kids
- I share my bed with someone
- I travel frequently
- I live a hectic life
- I feel stressed

Continue

The app then asks a few questions about your lifestyle, goals, and sleeping habits. You can skip the questions or change your answers in the My Profile section. After the questionnaire, the app downloads any firmware updates, and you're ready to go.

TRACKING AND SCORING YOUR WELLNESS WITH THE OURA RING

During the day, the Oura automatically tracks your steps, miles traveled, calories burned, activity level, inactive time, and naps. It also tracks both your active and total calorie burn; the former tallies calories burned while you're working out or engaging in other physical activities, and the latter also includes the calories you burn at rest.

> **The Oura tracks your steps, miles traveled, calories burned, activity level, inactive time, and naps.**

The app initially set an activity goal for me to actively burn 300 calories a day, which I found too easy between my twice-daily dog walks, regular yoga practice, and smart gym equipment testing. I searched for a way to manually increase my active-calorie-burn goal but couldn't find one. Fortunately, the app automatically upped my activity goal to 400 calories after I'd worn the ring for a while. To encourage you to stay active, the Oura app can remind you to get moving after 50 minutes of inactivity.

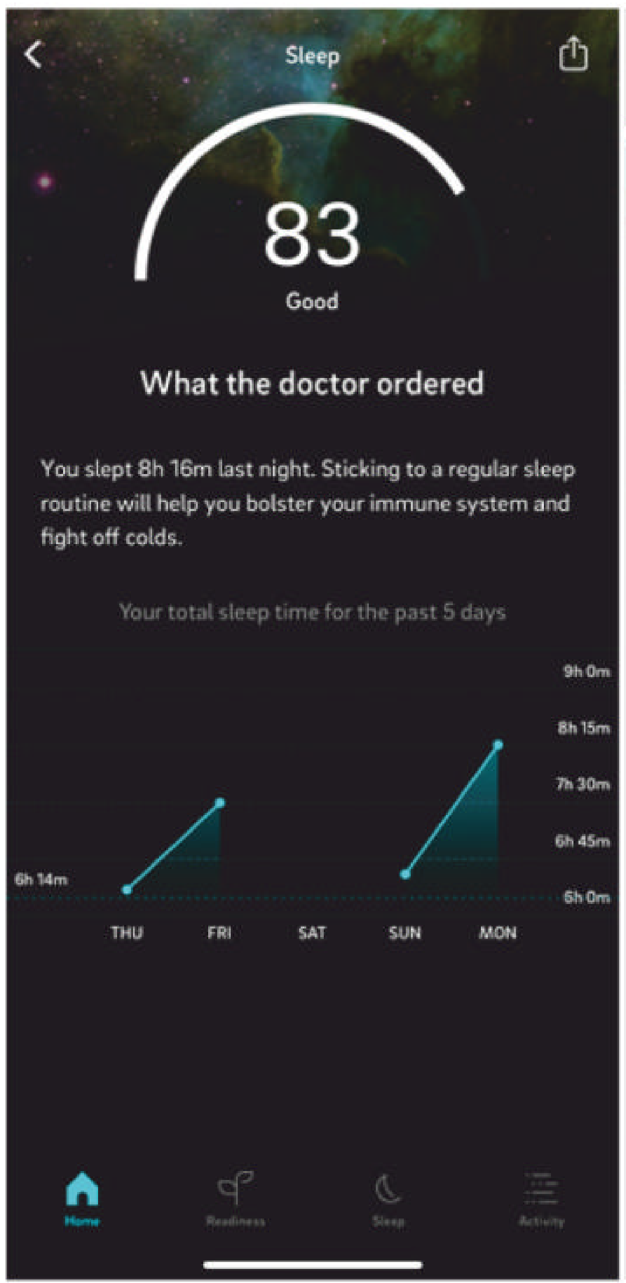
Unfortunately, the Oura doesn't offer a way to track your workouts in real time. For it to take your workouts into account in your activity and recovery metrics, you must either link your Apple Health or Google Fit account, so sessions you track with a different device are automatically imported, or manually add them into the Oura app after the fact. When manually adding a workout, you can select the type (the many options include badminton, baseball, yardwork, and yoga) and your start time, duration, and intensity (easy, moderate, or hard).

While its activity and workout features are pretty basic, the Oura shines as a sleep tracker. When you wear it to bed, it tracks your light, deep, and REM sleep, as well as your total time asleep, your time in bed, how long it takes you to fall asleep, and disturbances throughout the night.

Overnight, it also tracks your respiratory rate (the number of breaths you take per minute), resting heart rate (the number of times your heart beats per minute while you're at rest), heart-rate variability (HRV, or the variation in milliseconds between each heartbeat), and body temperature variations (whether you're running hotter or cooler compared with previous days and weeks, and by how much).

HRV and body temperature are two advanced metrics that aren't available on all other wearables. But a growing number of high-end smartwatches and fitness trackers, including the Apple Watch and Fitbit Sense, do offer HRV readings. Body-temperature measurements are less common but are also available on the Sense.

The company explains that your HRV can range from less than 20 to more than 100, and in general, a high HRV is a sign of good general health and fitness, while a low HRV can indicate stress or overtraining. The ring measures your temperature at night, when your body is least affected by environmental and lifestyle factors, and tracks deviations from your baseline. It might, for instance, say that you're 0.1 degree hotter than usual. A sudden, sharp rise in your body temperature can, of course, signal that you're coming down with something.

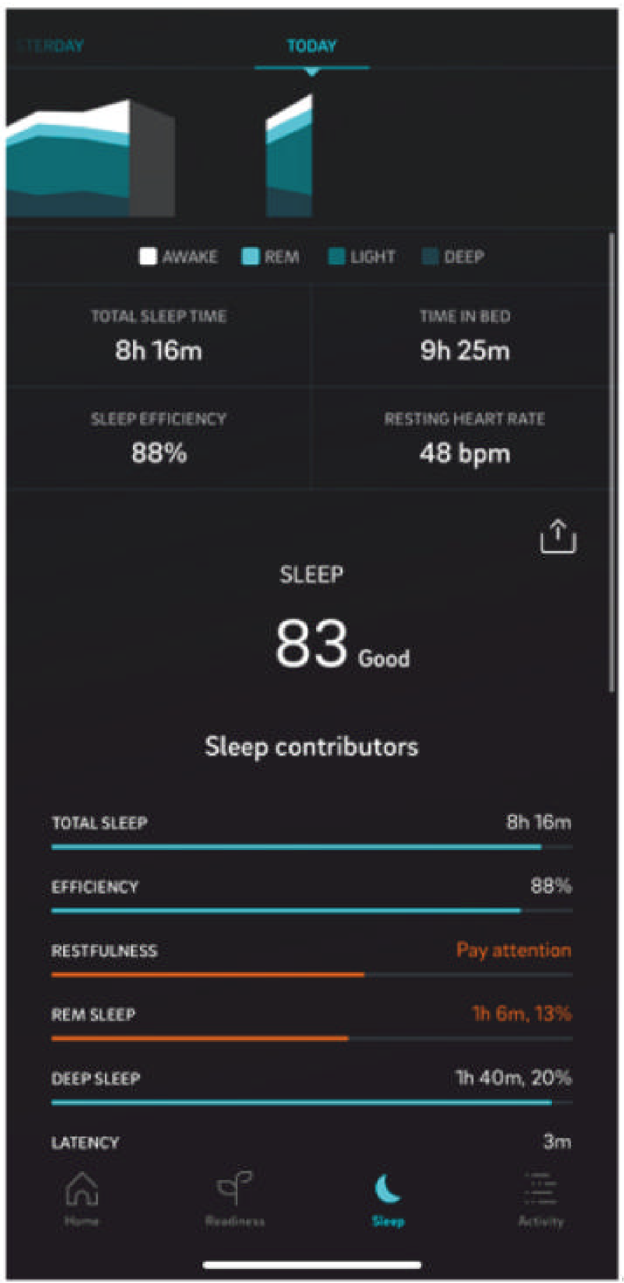


83
Good

What the doctor ordered

You slept 8h 16m last night. Sticking to a regular sleep routine will help you bolster your immune system and fight off colds.

Your total sleep time for the past 5 days

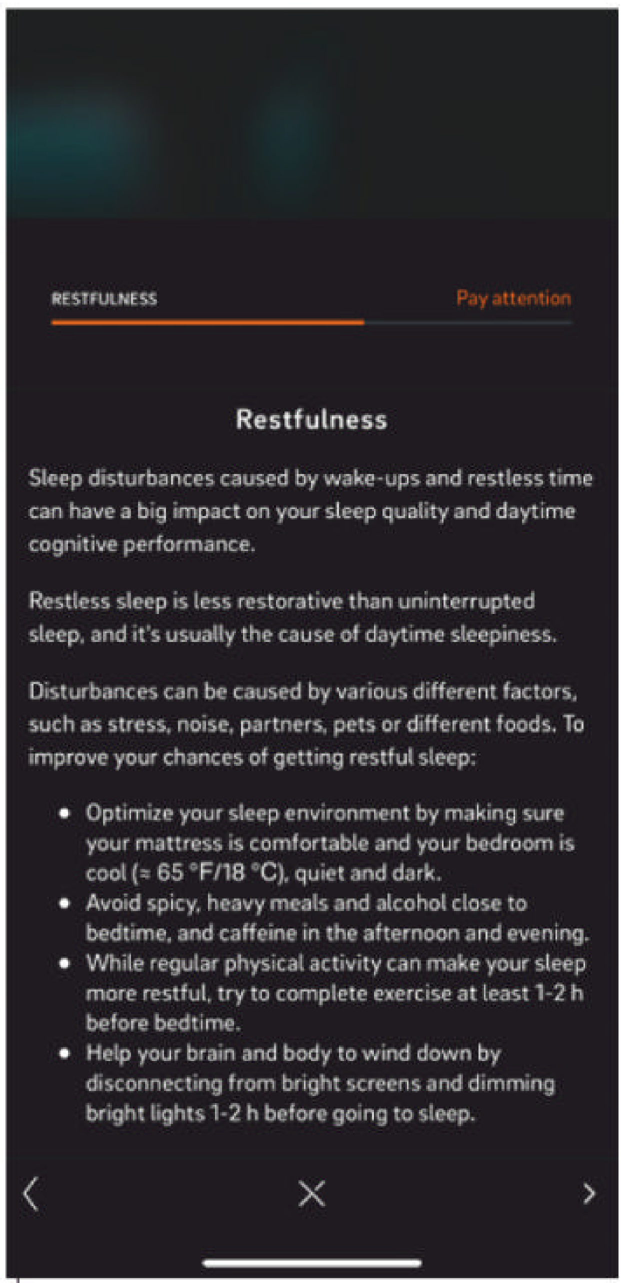


TOTAL SLEEP TIME	TIME IN BED
8h 16m	9h 25m
SLEEP EFFICIENCY	RESTING HEART RATE
88%	48 bpm

SLEEP
83 Good

Sleep contributors

TOTAL SLEEP	8h 16m
EFFICIENCY	88%
RESTFULNESS	Pay attention
REM SLEEP	1h 6m, 13%
DEEP SLEEP	1h 40m, 20%
LATENCY	3m



RESTFULNESS Pay attention

Restfulness

Sleep disturbances caused by wake-ups and restless time can have a big impact on your sleep quality and daytime cognitive performance.

Restless sleep is less restorative than uninterrupted sleep, and it's usually the cause of daytime sleepiness.

Disturbances can be caused by various different factors, such as stress, noise, partners, pets or different foods. To improve your chances of getting restful sleep:

- Optimize your sleep environment by making sure your mattress is comfortable and your bedroom is cool (≈ 65 °F/18 °C), quiet and dark.
- Avoid spicy, heavy meals and alcohol close to bedtime, and caffeine in the afternoon and evening.
- While regular physical activity can make your sleep more restful, try to complete exercise at least 1-2 h before bedtime.
- Help your brain and body to wind down by disconnecting from bright screens and dimming bright lights 1-2 h before going to sleep.

At the bottom of the Oura app, you'll see tabs for Home, Readiness, Sleep, and Activity. In Home, you can quickly see your progress toward your activity goal; your daily activity, readiness, and sleep scores (which can all range from zero to 100); bedtime guidance; and any activities you have manually logged or that have been automatically imported from your Apple Health or Google Fit account.

Your activity score measures how active you were that day and over the past week. When calculating this score, the Oura takes into account your total inactive time, move alerts over the past 24 hours, how often you've reached your daily activity goal over the past week, training frequency (how many times you've tracked medium- to high-intensity workouts over the past seven days), training volume (the duration of your medium- to high-intensity workouts over the past seven days), and recovery time (the number of days you've taken it easy over the past week).

Your readiness score takes into account a number of factors to measure your overall recovery and ability to perform at your peak. These factors include your resting heart rate, body temperature, heart rate variability balance (how your HRV trends over the past two weeks compare with your three-month average), recovery index (how long it takes for your resting heart rate to stabilize during the night), your previous night's sleep as well as the past two weeks, and your activity the previous day and over the past few days.

After one bad night's sleep, the Oura app said my readiness had started to decline, and suggested I take a moment to reflect on my past few days, asking, "Is there something you could do differently today to stop the downward trend?" Indeed, I had let my dog Bradley sleep in my bed the night before, and he woke me up around 3 a.m. by trying to snuggle directly on top of me, after which I had a hard time getting back to sleep. Seeing this note in the Oura app was a bit of a wake-up call; the next night, I made Bradley stay in his own bed, and I slept much better.

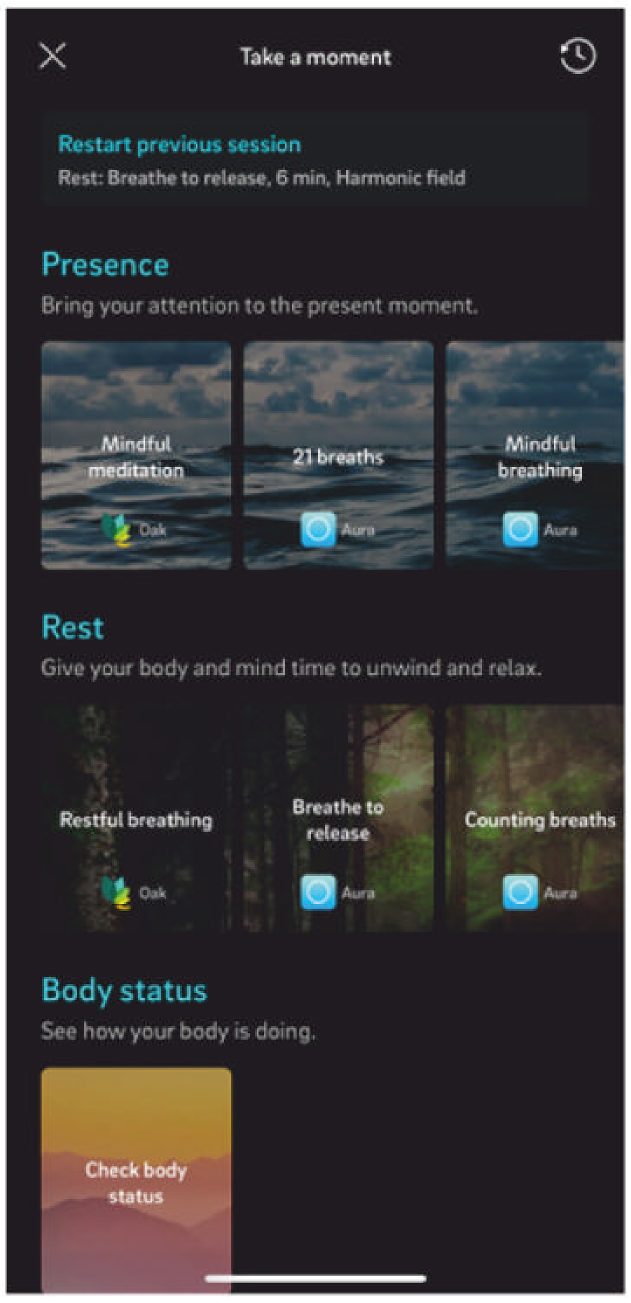
Your sleep score measures how well you slept overall, taking into account factors such as your total sleep time, efficiency (the percentage of time you actually spent asleep after going to bed), disturbances and restlessness throughout the night, how much time you spent in the REM and deep sleep phases, how long it took you to fall asleep, and the time of day you slept.

The app also shows an individual value or score for each of the activity, readiness, and sleep metrics listed above, and you can click into each one for an explanation. It also offers daily, weekly, and monthly trend graphs for each metric, as well as your overall activity, sleep, and readiness scores. I'm happy to report that in the month that I've been using the Oura, my average sleep score increased from 64 to 72 and my readiness score increased from 70 to 71. My activity score decreased from 98 to 96, but I think that's more of a reflection of me forgetting to manually record my workouts in the Oura app than an actual decrease in my activity level.

TAKING A MOMENT TO REDUCE STRESS

The Oura offers a feature called Moment, in partnership with meditation services Aura and Oak, that's designed to help you de-stress and practice mindful breathing. There are a handful of guided meditation sessions from Aura and Oak in the app, as well as a feature that lets you practice unguided for as long as you want, with a soundscape or in silence.

While taking a Moment, the Oura measures your resting heart rate and other metrics depending on the duration of the session, including your HRV trends and skin temperature variation, so you can see how it impacts your health. Afterward, it asks you to rate how you feel (much better, better, the same, worse, or much worse than usual).

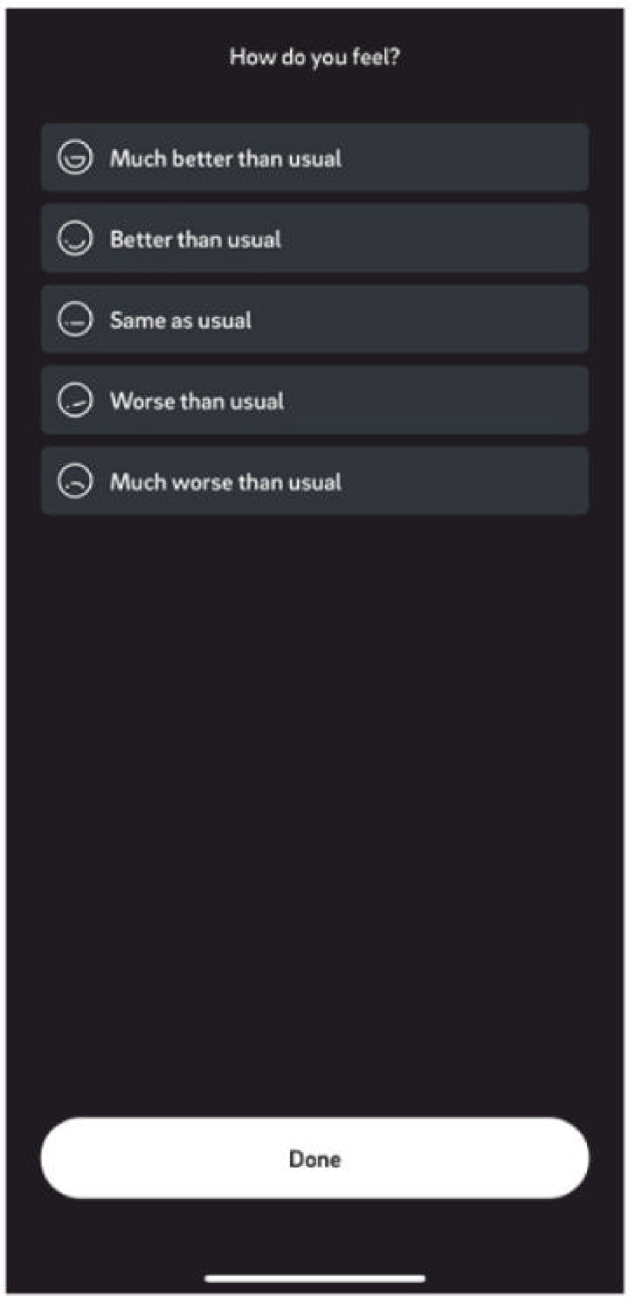

Take a moment
Restart previous session
Presence
Mindful meditation
Oak
21 breaths
Aura
Mindful breathing
Aura
Rest
Restful breathing
Oak
Breathe to release
Aura
Counting breaths
Aura
Body status
Check body status

Rest: Breathe to release, 6 min, Harmonic field

Bring your attention to the present moment.

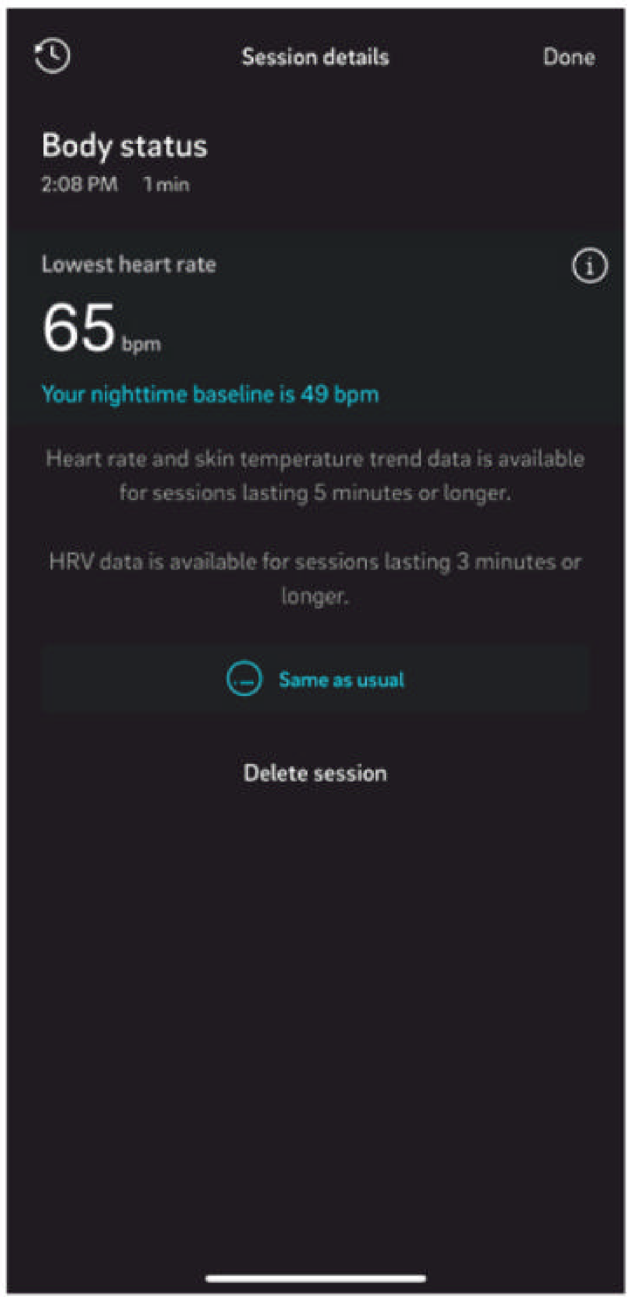
Give your body and mind time to unwind and relax.

See how your body is doing.



How do you feel?

○ Much better than usual
○ Better than usual
○ Same as usual
○ Worse than usual
○ Much worse than usual


Session details
Done
Body status
Same as usual
Delete session

2:08 PM 1 min

Lowest heart rate

65 bpm

Your nighttime baseline is 49 bpm

Heart rate and skin temperature trend data is available for sessions lasting 5 minutes or longer.

HRV data is available for sessions lasting 3 minutes or longer.

The app also lets you manually record various health-impacting events and the date and time they occurred, including everything from alcohol or caffeine intake to CBD use to COVID-19 infection.

> **The app also lets you manually record various health-impacting events and the date and time they occurred.**

A DIFFERENT KIND OF HEALTH TRACKER

The Oura Ring is a welcome alternative to wrist-worn health trackers—it’s far more discreet, comfortable to wear 24/7, and needs to be charged only once a week. Since it starts at $299, we wish it delivered more when it comes to keeping tabs on workouts and activity, though it’s terrific for monitoring your sleep and offering insights into your health.

If you’re open to a more traditional fitness tracker, we suggest checking out the attractive Garmin Vivoactive 4, our Editors’ Choice in this price range, which also delivers insights about your breathing, sleep, and stress, in addition to a range of excellent fitness and smartwatch features. The Apple Watch SE is another good alternative if you’re looking for a smartwatch, and it costs $20 less than the Oura. That said, wearable tech is meant to be worn, and if a ring is a more appealing form factor to you than a wristband, the Oura might be the right tracker for you.

ANGELA MOSCARITOLO

$99.99 | **Rating:** ●●●○○ **GOOD**

HP Omen Spacer Wireless TKL Keyboard: Lacks a Few Features

In the small but growing wireless-mechanical keyboard field, the HP Omen Spacer Wireless TKL Keyboard is one of the few tenkeyless (TKL) gaming keyboards. Considering that competitive gamers often like compact keyboards, it's a smart feature combination. The Omen Spacer offers a satisfying typing feel and lengthy battery life, but it lacks the robust customization that you'd typically find in a premium gaming keyboard.

TAKING SPACE

The HP Omen Spacer is a surprisingly simple gaming keyboard. Its keys are set in an almost-standard 87-key TKL layout. The scroll lock key has been replaced with a much more useful Omen key, a button that launches the keyboard's Omen Game Hub configuration software. (If you don't use the software, you can use Game Hub to switch the Omen key to act as a scroll lock key.) At 1.47 by 14.5 by 5.47 inches (HWD), it's fairly large for a TKL, a format that people often consider, in part, to make room on their desks. It's even larger when you factor in the detachable wrist rest, which adds another 4 inches of depth.

The wrist rest, which magnetically connects to the keyboard, is lightly padded. I always appreciate when a keyboard comes with a wrist rest, but this one's built more for looks than comfort.

The Omen Spacer carries a monolithic, brutalist look. It has a black base and black keycaps that are set against white-and-red backlit keys. The legends come in a thick, blocky font. The base and wrist rests are thick and tall, with sharp corners that poke you when you approach them from the wrong angle. Unlike most gaming keyboards, the Omen Spacer doesn't let you soften the look by changing the keyboard's lighting. Although you can change the lighting pattern or toggle specific lighting zones, the colors aren't customizable. Per-key RGB customization is standard practice for gaming keyboards, especially mechanical keyboards that cost more than $100. It's curious and disappointing to see HP falter on these basics.

There are a few small, surprising omissions in the Omen Spacer's design. It's the first keyboard we've reviewed in years, gaming or otherwise, without adjustable feet to let you tilt the keyboard. In addition, the keyboard's base lacks a storage slot for the wireless dongle. Quality-of-life considerations like these, even small ones, make all the difference in crafting a keyboard that feels luxurious or basic. Too often, the Spacer feels like the latter.

Underneath the caps, the HP Omen Spacer features Cherry MX Brown mechanical switches. Cherry Brown is a tactile switch, so there's a physical bump you can feel when the key actuates. They require more push than linear switches such as Cherry MX Reds, which are more common in gaming keyboards. While it is, again, a curious choice—most gaming keyboard companies, when they only use one switch, go linear—this isn't a

HP Omen Spacer Wireless TKL Keyboard

PROS Great battery life. Solid typing feel. Included configuration software.

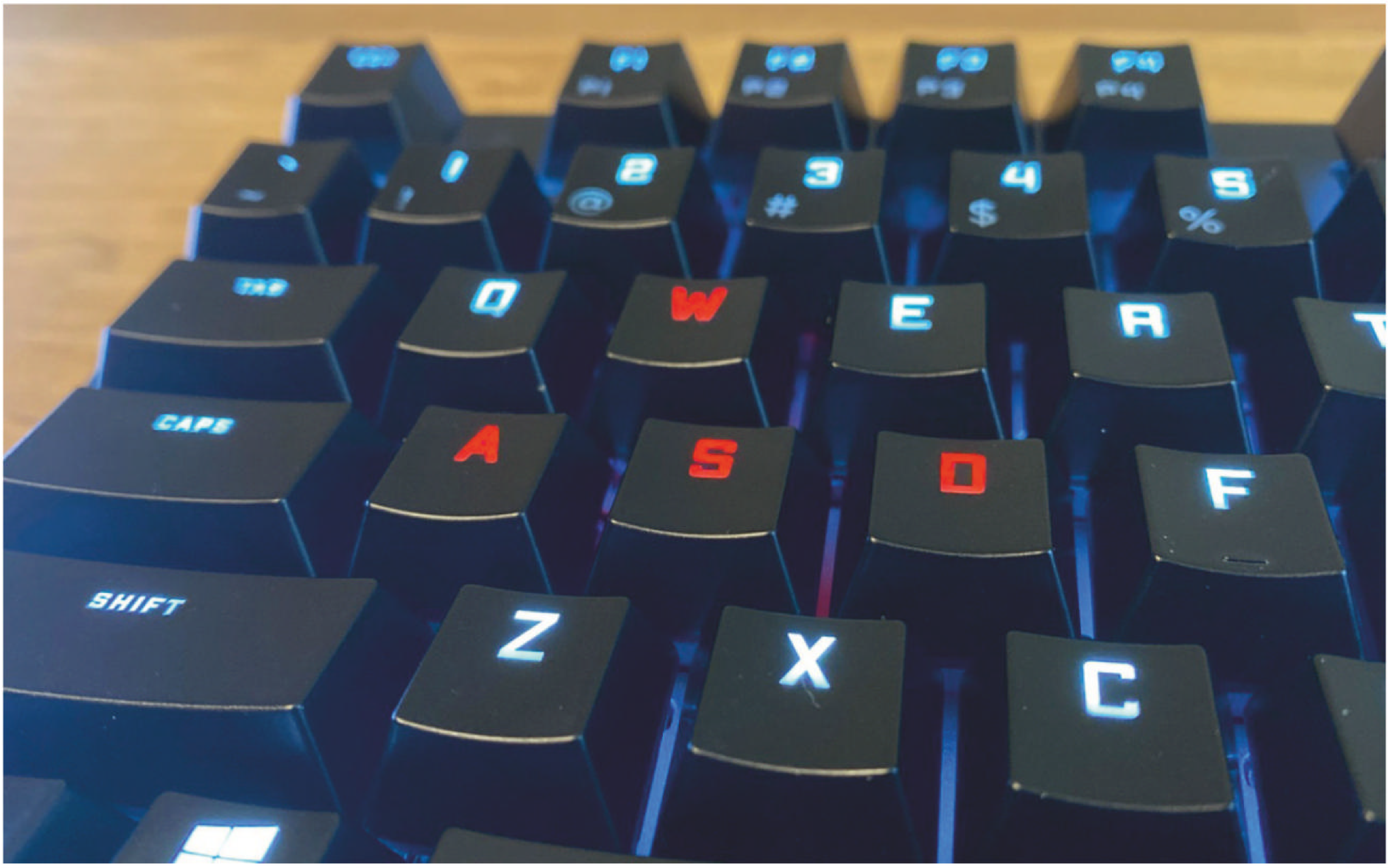
CONS Limited customization: Wrist rest has pointy corners. Lacks adjustable feet.

BOTTOM LINE Wireless, mechanical, tenkeyless keyboards aren't easy to find. HP's gaming-focused entry in that small category offers many cool, top-level features, but lacks a few basic ones that you'd expect in a high-end keyboard.

bad choice. Unless you strongly prefer the loud clack of a clicky-style switch, Cherry Browns provide a comfortable feel for both gaming and typing. It’s exactly the kind of switch you want if you game and work on the same PC, which more of us do these days.

As with other recent wireless gaming peripherals, such as the HP Omen Vector Wireless Mouse, HP nails the Omen Spacer’s wireless elements. The keyboard connects to devices via a 2.4GHz wireless connection that provides a smooth connection with no noticeable lag, even in a crowded wireless airspace. Is it disappointing that the Omen Spacer doesn’t also have Bluetooth support, which would expand its utility? Yes, but realistically, this isn’t a deal breaker for PC gaming.

The highlight here, as with the Omen Vector, is the battery life. According to HP, the Omen Spacer can last up to 75 hours on a single charge. That is, of course, with the backlighting off. In my experience, the battery lasts between 25 and 30 hours of regular but not continuous use with the backlighting on high. That’s good. Most wireless keyboards get less than half their max battery output with the lighting cranked to more than 50% brightness. When you need to juice the Omen Spacer, its USB-C cable doubles as a wired connection.



LOST COMMAND

The Omen Spacer has limited software-based customization options. Accessed through HP's Omen Gaming Hub app, the customization options let you toggle some—or all—of the keyboard's lighting, or you can set a pattern. Shockingly, you cannot remap keys. Instead, HP set aside five function-key shortcuts, Fn+F1 through Fn+F5, as open shortcuts that you can use for custom macros and other functions. This is highly restrictive, considering that practically every gaming keyboard lets you customize your device however you please.

In fairness, the features that are present are clear and easy to navigate. Omen Gaming Hub is slick and can double as an inter-platform game launcher that facilitates remote play on Omen PCs. The app requests lots of data about your PC, though, so I recommend you avoid using it for anything other than configuring the keyboard.

FILLING THE VOID

Wireless, mechanical, gaming keyboards are few and far between. Wireless, mechanical, gaming TKLs are almost non-existent. The HP Omen Spacer helps fill that void, and it boasts a good typing feel, solid connectivity, and long battery life. That said, the keyboard lacks the deep customization features that are commonplace in premium-priced gaming keyboards. If you don't mind a cord and no configuration software, the Drop ENTR ($90) is an excellent, tenkeyless, mechanical keyboard that's an Editors' Choice winner.

MIKE EPSTEIN

Starts at $1,299.99; $1,699.99 as tested | **Rating:** ●●●●◐ GOOD

HP Spectre x360 14: A Game-Changing Convertible

HP still sells the Spectre x360 13, but you can forget about it. The Spectre x360 14 is an elegant convertible laptop that ditches the older system's 13.3-inch touch screen—and its familiar 16:9 aspect ratio—for a 13.5-inch panel with a squarer 3:2 ratio, for a superior view of text and web pages. Basically, it says, "I see you and raise you" to the 16:10 display of the Dell XPS 13 2-in-1. Add to that some immaculate engineering, gorgeous OLED screen technology, and a stylus pen and USB Type-A port that the Dell lacks, and the Spectre edges out the XPS 13 2-in-1, snatching the Editors' Choice award as our new favorite premium convertible.

SPECTRAL ANALYSIS: SLEEK, SVELTE, AND STYLISH

The Spectre x360 14 is an Intel Evo laptop, so it flaunts the chipmaker's latest innovations, including rapid wake, Thunderbolt 4 ports, and an 11th Generation "Tiger Lake" processor with Iris Xe integrated graphics. The $1,299.99 base model at HP.com combines Core i5 power with 8GB of memory, a 256GB solid-state drive, and a 1,920-by-1,280-pixel touch screen. One of HP's Sure View Reflect privacy screens is optional; a rechargeable tilt pen and carrying sleeve are standard. (The stylus clings magnetically to the side of the laptop instead of fitting into a niche.)

Our test unit steps up to an OLED touch panel with 3,000-by-2,000-pixel resolution and 100% coverage of the DCI-P3 color gamut, as well as a quad-core, 2.8GHz (4.7GHz turbo) Core i7-1165G7 CPU, 16GB of RAM, and a 1TB NVMe SSD bolstered by 32GB of Intel Optane Memory. Wi-Fi 6 and Bluetooth are onboard, though users who roam far from hotspots will be sad there's no WWAN option.

HP Spectre x360 14

PROS High-fashion styling. Dazzling OLED touch screen with 3:2 aspect ratio. Handy shortcut keys and utility software. Rechargeable pen and carrying sleeve in box. Lively performance (apart from gaming).

CONS No HDMI port. No LTE mobile broadband option. No sign of the 007 SPECTRE octopus logo.

BOTTOM LINE Its tall OLED screen and swank, thoughtful design vault the HP Spectre x360 14 to the top rank of convertible laptops.

As with previous Spectres, the Spectre x360 14 is one of the most attractive laptops you can buy, with gem-cut contrasting edges highlighting its CNC-machined aluminum chassis. It's available in Nightfall Black with Copper Luxe accents or Poseidon Blue with Pale Brass accents, each $10 more than the shy silver model. HP's stylized four-slash logo decorates the lid, which unfortunately takes two hands to open. (You must hold the base down while lifting the lid.) Two hinges let you fold the display back into the easel, tent, and tablet modes well known to hybrid users. The screen barely wobbles when tapped in laptop mode, and you'll feel almost no flex in the chassis when you grasp its corners or press the keyboard deck.

At 0.67 by 11.8 by 8.7 inches, the system is slightly deeper than the Dell XPS 13 2-in-1 (0.56 by 11.7 by 8.2 inches), as well as barely heavier (2.95 versus 2.9 pounds). Among hybrid laptops that have screens with a 16:9 aspect ratio, the 13.3-inch Asus ZenBook Flip S is 0.54 by 12 by 8.3 inches, and the 14-inch Lenovo Yoga 9i is 0.6 by 12.6 by 8.5 inches. The screen bezels are ultra-thin (HP boasts a 90.33% screen-to-body ratio), yet the webcam remains properly located, positioned above, instead of below, the display.

The laptop's left edge holds a USB 3.2 Type-A port. You'll find two Thunderbolt 4/USB-C ports on the right side (actually, one on the side and the other, suitable for the AC adapter, on the diagonal-cut rear corner), along with an audio jack and a microSD card slot.

You'll need a USB-C dongle to connect an external monitor that has anything but a Thunderbolt or USB-C interface. The ZenBook Flip S, in contrast, wins points for providing an HDMI output, but it loses an equal amount for omitting the audio jack.

A NEW PERSPECTIVE: AWED BY OLED

Displays with 3:2 aspect ratios aren't unprecedented. Microsoft uses them for its various Surface Pro tablets and Surface Laptop clamshells, and the Acer Spin 713 is one of our favorite Chromebooks. But once you get used to their roughly 20% taller view of browsers and productivity apps, it's hard to go back to a 16:9 screen (unless you use your laptop primarily for watching videos).

The Spectre's OLED screen is lovely, with ample brightness, sky-high contrast, pristine white backgrounds, and deep blacks. Colors are rich, vivid, and saturated, and fine details are sharp. The two-button tilt stylus kept up with my fastest swipes and scribbles in tablet mode, with a comfortable pen-on-paper feel and good palm rejection as I rested my wrist on the glass.

I always criticize HP laptop keyboards for arranging the cursor arrow keys in a clumsy row instead of the correct inverted T, with half-size up and down arrows squeezed between full-size left and right arrows. But otherwise, the brightly backlit keyboard is fine, with dedicated Home, End, Page Up, and Page Down keys and a somewhat shallow but snappy typing feel.

The keyboard incorporates functions often moved to the palm rest or sides, from the fingerprint reader (which replaces the right-side Control key, a slight quibble if you often use that) and power button to special keys to toggle the webcam privacy shutter and launch the HP Command Center utility. The buttonless touchpad glides and taps smoothly, and clicks quietly.

The 720p webcam has IR face-recognition capability, joining the fingerprint reader to give you two ways to access Windows Hello logins. Its images are slightly soft-focus but reasonably bright, colorful, and static-free. Four speakers and an amplifier produce admirable sound, not particularly loud, but not tinny or hollow, either. The bass is noticeable, and it’s easy to distinguish overlapping tracks. Bang & Olufsen software lets you choose among music, movie, and voice presets, as well as fiddle with an equalizer.

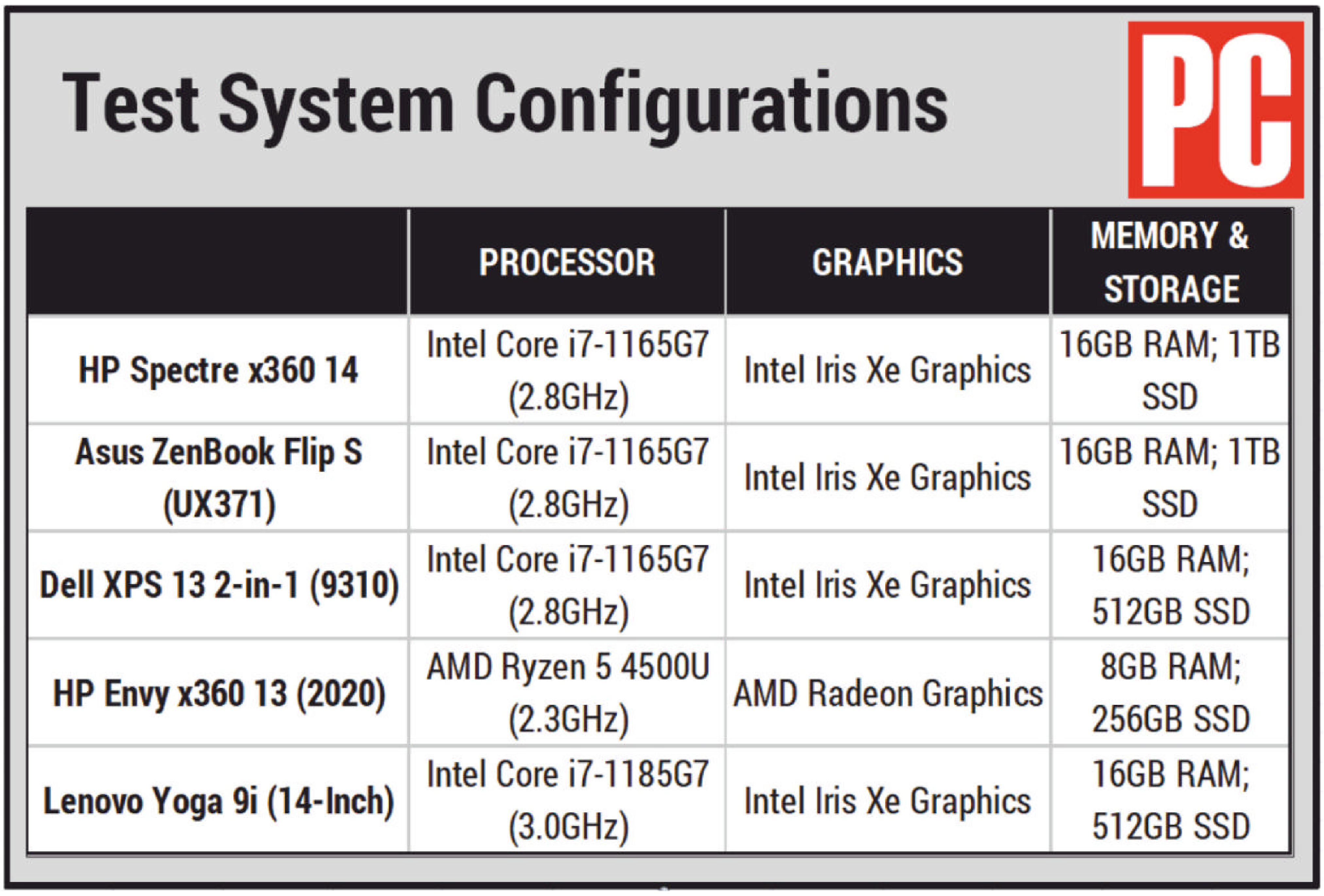
The pop-up HP Command Center lets you turn on application-based network prioritization. Also here, you can change the default Smart Sense system tuning and cooling fan setting to balanced, cool, performance, or quiet modes. (I used the performance option for our benchmark tests, and Smart Sense for our battery-life measurement.) A Focus Mode toggle dims the screen except for the active window.

HP Display Control offers default/vibrant, native, sRGB, Adobe RGB, DCI-P3, or automatic color palette selection. Other software on the Windows 10 Home system includes Amazon Alexa, as well as ExpressVPN, McAfee LiveSafe, and LastPass trials. The company also notes that in-bag detection keeps the laptop from overheating in your briefcase.

> **“The Spectre’s OLED screen is lovely, with ample brightness, sky-high contrast, pristine white backgrounds, and deep blacks.”**

PERFORMANCE TESTING: A CONVERTIBLE CLASH

For our benchmark comparisons, I pitted the Spectre x360 14 against three premium 2-in-1 models already mentioned: the Lenovo Yoga 9i, the Asus ZenBook Flip S, and the Dell XPS 13 2-in-1. The last slot went to our Editors' Choice winner among mid-priced convertibles, the HP Envy x360 13, whose AMD Ryzen 5 CPU makes a change from "Tiger Lake" Core i7 chips. You can see the contenders' basic specs in the table below.



Test System Configurations

	PROCESSOR	GRAPHICS	MEMORY & STORAGE
HP Spectre x360 14	Intel Core i7-1165G7 (2.8GHz)	Intel Iris Xe Graphics	16GB RAM; 1TB SSD
Asus ZenBook Flip S (UX371)	Intel Core i7-1165G7 (2.8GHz)	Intel Iris Xe Graphics	16GB RAM; 1TB SSD
Dell XPS 13 2-in-1 (9310)	Intel Core i7-1165G7 (2.8GHz)	Intel Iris Xe Graphics	16GB RAM; 512GB SSD
HP Envy x360 13 (2020)	AMD Ryzen 5 4500U (2.3GHz)	AMD Radeon Graphics	8GB RAM; 256GB SSD
Lenovo Yoga 9i (14-Inch)	Intel Core i7-1185G7 (3.0GHz)	Intel Iris Xe Graphics	16GB RAM; 512GB SSD

Productivity and Media Tests: PCMark 10 and 8 are holistic performance suites developed by the PC benchmark specialists at UL (formerly Futuremark). The PCMark 10 test we run simulates different real-world productivity and content-creation workflows. We use it to assess overall system performance for office-centric tasks such as word processing, spreadsheet jockeying, web browsing, and videoconferencing. PCMark 8, meanwhile, has a storage subtest that we use to assess the speed of the system's boot drive. Both yield a proprietary numeric score; higher numbers are better.

All five hybrids exceeded the 4,000 points that indicate excellent productivity in PCMark 10, with the Spectre topping the Yoga for the win. Their speedy SSDs breezed through PCMark 8's storage exercise.

Next is Maxon's CPU-crunching Cinebench R15 test, which is fully threaded to make use of all available processor cores and threads. Cinebench stresses the CPU rather than the GPU to render a complex image. The result is a proprietary score indicating a PC's suitability for processor-intensive workloads.

Cinebench is often a good predictor of our Handbrake video-editing benchmark, in which we put a stopwatch on systems as they transcode a brief movie from 4K resolution down to 1080p. It, too, is a tough test for multi-core, multi-threaded CPUs; lower times are better.

The Asus failed to keep up with its Intel stablemates, while the Envy's extra processing cores (six versus four) failed to give it an advantage. The Spectre performed solidly.

We also run a custom Adobe Photoshop image-editing benchmark. Using an early 2018 release of the Creative Cloud version of Photoshop, we apply a series of 10 complex filters and effects to a standard JPEG test image. We time each operation and add up the total. (Lower times are better.) The Photoshop test stresses the CPU, storage subsystem, and RAM, but it can also take advantage of most GPUs to speed up the process of applying filters.

The Intel-powered convertibles finished in a close pack, a half-minute or more quicker than the AMD-based Envy. The Spectre's brisk response and stellar screen make it a fine choice for photo management, though I had a little trouble getting my microSD card out of its slot.

Graphics Tests: 3DMark measures relative graphics muscle by rendering sequences of highly detailed, gaming-style 3D graphics that emphasize particles and lighting. We run two different 3DMark subtests, Sky Diver and Fire Strike. Both are DirectX 11 benchmarks, but Sky Diver is more suited to laptops and midrange PCs, while Fire Strike is more demanding and lets high-end PCs and gaming rigs strut their stuff.

The Yoga claimed the gold medal, with the Spectre close behind. Thanks to Intel's Iris Xe, these laptops' integrated graphics can handle some light or casual gaming, even while they are no threat to the discrete GPUs of "true" gaming notebooks.

Next up is another synthetic graphics test, this time from Unigine Corp. Like 3DMark, the Superposition test renders and pans through a detailed 3D scene, this one rendered in the eponymous Unigine engine for a second opinion on the machine's graphical prowess.

Again, these laptops are built for productivity and creativity apps, not games. Intel's Iris Xe graphics are superior to its older integrated UHD Graphics solutions, but that's not saying a whole lot when it comes to really demanding graphics tasks like the 1080p test here.

Battery Rundown Test: After fully recharging the laptop, we set up the machine in power-save mode (as opposed to balanced or high-performance mode) where available and make a few other battery-conserving tweaks in preparation for our unplugged video rundown test. (We also turn Wi-Fi off, putting the laptop into airplane mode.) In this test, we loop a video—a locally stored 720p file of the Blender Foundation short film *Tears of Steel*—with screen brightness set at 50% and volume at 100% until the system quits.

The Lenovo Yoga 9i is the standout for stamina, lasting nearly 18 hours. The other contenders should certainly get you through a full day of work or school; the two OLED screens were hardest on battery life, but the Spectre outlasted the ZenBook.

THE VERDICT: WE HAVE A WINNER

Competition among high-end convertible laptops is fierce, but the 3:2 aspect ratio of the HP Spectre x360 14's screen would make it a game-changer even if it didn't have the advantage of its stunning OLED technology.

Except for wishing it had an HDMI port, we are having trouble finding anything to criticize—this Spectre x360 has the beautiful design and OLED goodness of its 15.6-inch sibling in a considerably easier-to-carry package. It not only deserves our Editors' Choice award in its category, it ranks among our top four or five laptops, period.

ERIC GREVSTADT

SilverStone
U2
U3
U3

$109.99 | **Rating:** ●●●●○ **EXCELLENT**

SilverStone Sugo 14: Mini-ITX PC Case

SilverStone's new Sugo 14 PC case is an innovative mini-ITX model that can fit a surprising loadout of components inside. True to the Sugo line, this one is designed to pack peak power parts into a compact chassis. Inside, for example, you can fit a full-size ATX power supply, three 2.5-inch drives, a 240mm liquid cooler, and a triple-slot graphics card up to 13 inches long, all at the same time. (Other possible combinations can include larger drives, including even a legacy 5.25-incher.) The case has a few downsides and isn't the easiest to build in, but the low price and positive aspects more than make up for these shortcomings. Small-PC builders keen to stuff as much powerful hardware inside should give it a long look.

THE DESIGN: A MINI-ITX POWER BOX

The Sugo 14 measures 8.5 by 9.7 by 4.5 inches and has a volume of 19.55 liters. It's roughly the size of a large shoebox. Most of the PC cases I review are towers—full ATX cases—and it's amusing to think that this entire case would fit inside of some of my old test chassis and still have room left over.

The case is available in either a black or white color scheme; both have an offset gold line down the front to add a little contrast. The front panel, as well as the bottom panel, are the only faces of this case that don't come perforated to increase air flow.

Unlike with most compact cases, the panels that cover the four long sides of this case are all easy to remove. They're held on by two screws each. I referred above to the bottom panel, but this case doesn't technically have a single "bottom": It can be placed and used with almost any side facing down. The top panel has the most airflow perforation, however, and the left side holds the I/O panel. Because of that, it would make sense not to place either of these sides face down. But the case was designed to be used with either of the two remaining long sides as the bottom. SilverStone includes eight foot pads to allow for this repositioning logic.

SilverStone Sugo 14

PROS Compact size, but with room for large graphics cards and lots of drives. Room for 240mm liquid-cooler radiator. Seldom-seen support for 5.25-inch drives.

CONS Requires measured approach to PC building, and installing components in logical order.

BOTTOM LINE
SilverStone's Sugo 14 mini-ITX PC case may not be the easiest we've built in, but its moderate price and support for lots of power parts make the purchase (and the pre-build planning) worthwhile.

The front I/O panel consists of two USB 3.0 ports and a USB 2.0 port, along with a combo audio jack. (There's no USB-C port, which means no cutting-edge internal USB-C header cable—which not every mini-ITX motherboard would likely have a header connector for, in any event.) The power button is set off by itself on the front of the case.

THE BUILDING EXPERIENCE: MINI-ITX IS NEVER EASY

Building a system inside of the Sugo 14 isn't the easiest PC DIY process I've ever tackled. It could be daunting, especially for beginners. Mini-ITX cases, more than other sizes, punish a lack of foresight and planning.

These issues are understandable due to the chassis' small size and the way it's designed. SilverStone's aim was to make the case as versatile as possible while also leaving the potential to hold as much as possible. Some features do make putting the system together easier, but it's still more complicated than building out a system in a typical ATX or MicroATX case, which would have a lot more wiggle room.

All four of the long rectangular panels can be removed by extracting two screws each. This design makes it possible to access the system interior from all angles, and you have to remove at least three of them to build the PC properly. After removing all four panels, it's also best to remove the Sugo 14's mounting bracket, at the top of the case, which is designed to hold fans, a 240mm radiator, or a 5.25-inch drive. This isn't technically necessary, but it makes building the system a lot easier.

SilverStone
FP510
5.25" to 2.5" and 3.5" hot-swap drive bay adapter
750W
ST75F
80 PLUS
PF240

When the case is disassembled, you can slide the motherboard in through the top or from the left side of the case. After bolting it into place, it's best to go ahead and connect the cables for the front I/O panel before adding any more hardware. They'll get too tricky to access soon enough.

When installing the rest of your system components, some combinations are easier than others, and it's possible to block access to certain key connectors and other essentials if you don't plan a logical build order. I found it easiest to next add storage to the system. Or rather, it would have been easier if I actually had done this next. Instead, I added two sticks of RAM and the CPU cooler before the drives, and both got in the way. So did the motherboard main power cables, which I added third.

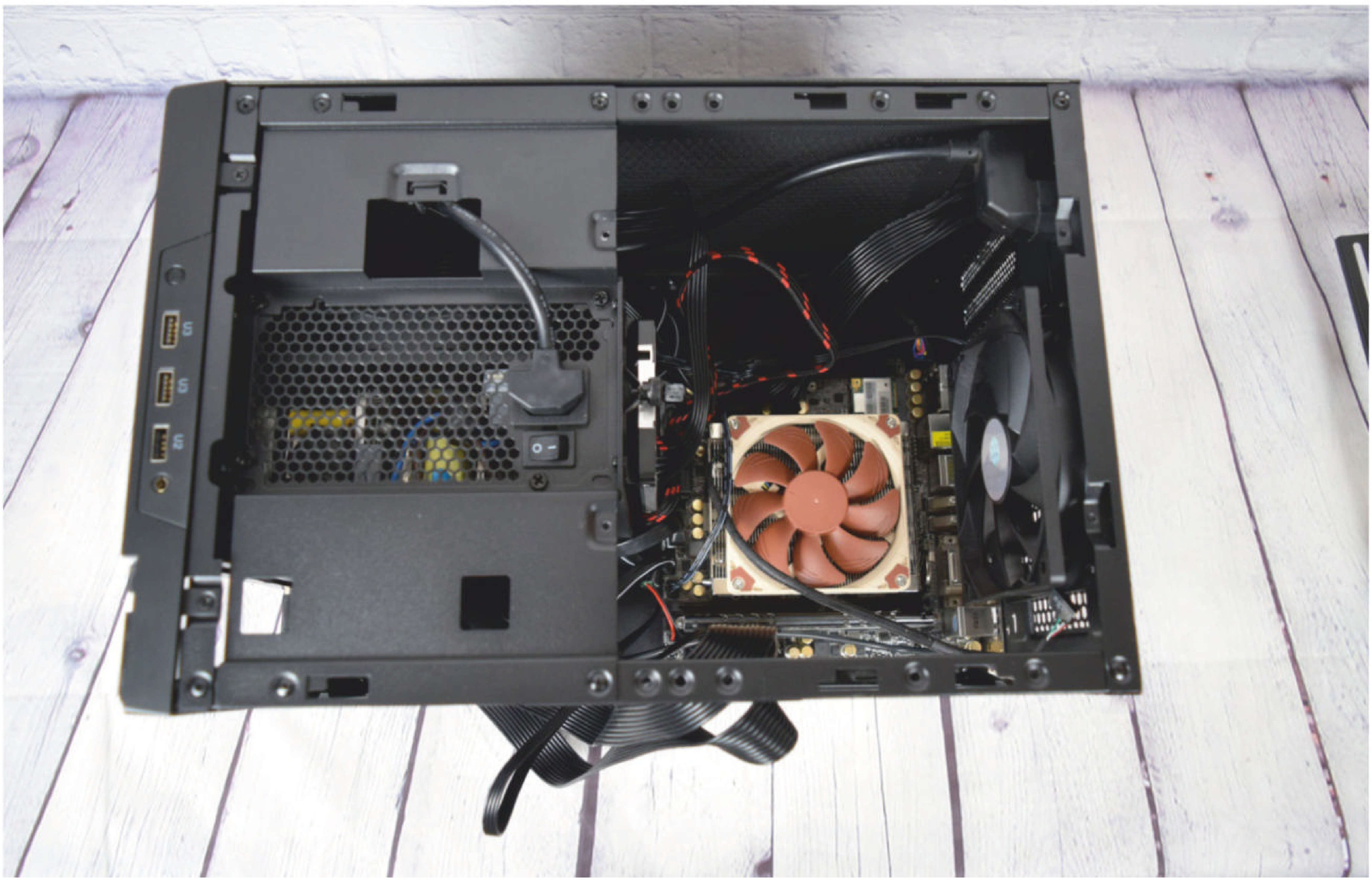
Lesson learned: You may not want to save storage for last. Ideally, though, you should install your actual CPU (and if you're using a small air cooler for the CPU, that too) on the motherboard before installing the board in the chassis.

Mini-ITX may be the limit for the mainboard, but the system can hold a lot of other hardware for such a small case. In total, you get room to mount three 2.5-inch drives as well as two 3.5-inch drives. The first of these 2.5-inch drive mounts is directly above the motherboard. The other two drive mounts are in an unconventional location outside of the case's frame. These reside underneath the front I/O panel, and they are hidden well out of sight, though certainly not in the easiest-to-access location.

One or two 3.5-inch desktop-style hard drives can be mounted to the multi-functional mounting bracket at the top of the case. The mount can't hold all of its supported hardware at the same time, though. If you opt to use a 5.25-inch device, such as a DVD optical drive, then you will be able to install only one 3.5-inch drive here. Alternately, if you want to liquid-cool and install a 240mm radiator, then you won't be able to have any 3.5-inch drives or a 5.25-incher. You can fit a 120mm radiator in beside one 3.5-inch hard drive, though.

SilverStone doesn't list explicitly that you can install both a 5.25-inch drive and a 120mm radiator to be mounted here together, but you can also mount a 120mm radiator to the back of the case, so this should be possible.

For my build, SilverStone sent along its FP510 5.25-inch hot-swap drive bay adapter, which is a useful device that adds two USB 3.1 Gen1 ports, a 3.5-inch drive bay, and a 2.5-inch drive bay to a 5.25-inch bay. The company also sent its PF240, a 240mm water cooler, but I wasn't able to use this cooler. The AMD-based mini-ITX board I had on hand for testing has its capacitors set close to the back of the CPU socket, which prevented me from mounting the cooler's bracket. So I settled for an aftermarket Noctua stock air cooler.



I did make use of the FP510 bay device, though. The cover over the 5.25-inch drive bay is a little tricky to remove, and when it comes off, it uncovers some unsightly holes that line the drive bay. SilverStone bundles a cosmetic piece of frame in the case's accessory kit that you'll need to snap into place to cover that surrounding area for a clean look. Don't lose this bit if you don't install a 5.25-inch drive right away; you may need it later.

Adding an ATX power supply unit (PSU) to the Sugo 14 is a little unconventional, as the bulk of it goes behind the front panel, but getting it into place is easy enough: You just lay the system on its side and slide the PSU body in from the bottom, then bolt it in from the top. A pass-through-style cable then runs the PSU's main power connector to a socket at the rear or the case. Realistically, putting a power supply into place just doesn't get any easier than this. SilverStone also gets kudos for not mandating a pricier-per-watt SFX compact PSU.

Getting the PSU cables into place was a bit tight, but I don't see much that SilverStone could have done to improve this, given the size of the case. The designers had already left cutouts in the case at appropriate locations for easy cable routing. It's simply difficult wiring up a system with this many cables in such a small space; that's the nature of mini-ITX. It certainly helps, though, to use a fully modular power supply for builds like this; I used SilverStone's ST75F-PT for my build to keep cable clutter to a minimum. A modular PSU, which will let you leave out any unused cables to reduce clutter, is definitely worth the investment.

Last but not least, adding a graphics card is painless. SilverStone provides three card-slot mounting points on this case, which means that you can add large triple-slot-width video cards to the system without issue. Cards can measure up to 330mm long (13 inches) and 148mm in width (5.8 inches) and still fit, and there's virtually nothing, aside from perhaps a stray cable, to get in the way when you're mounting the card into place. The biggest, newest GeForce RTX and Radeon RX cards should fit (assuming you can find one).

VERDICT: A GREAT BALANCE OF POWER AND MINI

Building a system inside SilverStone's Sugo 14 case is a unique experience and can be challenging in places, due to the cramped dimensions. But that is the path of the mini-ITX warrior. It's still an excellent case. Some larger MicroATX and full-ATX cases we've assembled PCs inside gave us a more fraught building experience. If you map out how to put the Sugo 14 together, depending on your components of choice, and test-fit the parts before the final build-out, it's not particularly difficult.

For such a small case, the Sugo 14 can hold a lot of hardware. Building a solid gaming PC in this system with the fastest processor and graphics card is entirely possible. All you need to do is shell out for a premium mini-ITX motherboard, which generally will cost you extra. And you can have a large amount of local storage, in the form of both hard drives and SSDs, for your gaming library.

Indeed, there's not much point in going for a case like this if you won't be putting a decent-size video card and a brace of storage inside, or at least want that flexibility. When it comes to this case, you'll want to think big about your small PC. But if you want a compact mini-ITX build that really packs in the power, the Sugo 14 is well worth considering.

MICHAEL SEXTON

$1,199 as tested | **Rating:** ●●●●○ **EXCELLENT**

MSI Alpha 15 (Late 2020): 2nd-Gen Evolution

MSI's Alpha 15 made waves at its debut a year ago for using all AMD hardware, the only gaming laptop to do so at the time. Other vendors have joined the ranks since then, but MSI prepared well by refreshing the Alpha 15 at the end of 2020 with a more powerful "Renoir" Ryzen 7 processor and a beefier 6GB Radeon RX 5600M graphics card. The new notebook churned out great 1080p gaming performance in our testing while keeping the high-end features of the original, such as its per-key RGB backlit keyboard. Our top choices among upper-entry-level gaming rigs remain the HP Omen 15 and the Acer Predator Helios 300, but the Alpha 15 is a credible alternative, especially if you can catch it on sale.

TOUCHED UP BY 'RENOIR'

The new Alpha's eight-core Ryzen 7 4800H CPU (2.9GHz base, up to 4.2GHz boost) gives it a leg up on similarly priced Intel gaming notebooks powered by the six-core Core i7-10750H. The Helios 300 is one example, going for $1,174 on Amazon with a 6GB Nvidia GeForce GTX 1660 Ti as I typed this review.

That said, the Alpha 15 must also contend with AMD-powered notebooks; HP offers a comparably equipped Omen 15 (model 15-en0029nr) for $1,249 while the Dell G5 15 SE goes for $1,205. These minimal price differences highlight the fierce competitiveness of this segment.

The MSI looks much the same as before on the outside. Its dark-silver palm rest contrasts nicely with the black of the rest of the laptop, though I'm still lukewarm about the green logo on the back of the lid. At least it's not backlit.

MSI Alpha 15

(Late 2020)

PROS Affordable price, Fluid 1080p gaming performance. Powerful eight-core AMD Ryzen CPU. Per-key RGB keyboard lighting and AMD FreeSync Premium screen. Long battery life.

CONS Noticeable fan noise. Mostly plastic construction. No built-in biometrics.

BOTTOM LINE The second generation of MSI's all-AMD Alpha 15 gaming laptop delivers much better performance and is still attractively priced.

The lid backing is the only metal on this laptop. Considering the Alpha 15 is now $100 or $200 more expensive than last year's model, it could stand more of it to feel as sturdy as the Acer and HP laptops. That said, all its surfaces do a good job of resisting flex.

The system is slightly oversize and overweight for a 15.6-inch gamer. Its 1.1-inch thickness is 0.2 inch more than the Omen 15, and it's heavier at 5.3 pounds versus 4.6 pounds. Trim side display bezels translate to a reasonable 14.1-inch width, though a thick bottom bezel extends its depth to 9.8 inches, 0.4 inch more than the HP.

The full HD (1,920-by-1,080-pixel) screen leaves little room for complaint. It not only offers IPS technology for wide viewing angles, an anti-glare coating, and a 144Hz refresh rate, but AMD FreeSync Premium technology to smooth out frame rates. Laptops with Nvidia G-Sync are far more expensive.

The screen has average brightness but an overall enjoyable picture with its rated 72% coverage of the NTSC gamut (about 100% of sRGB).

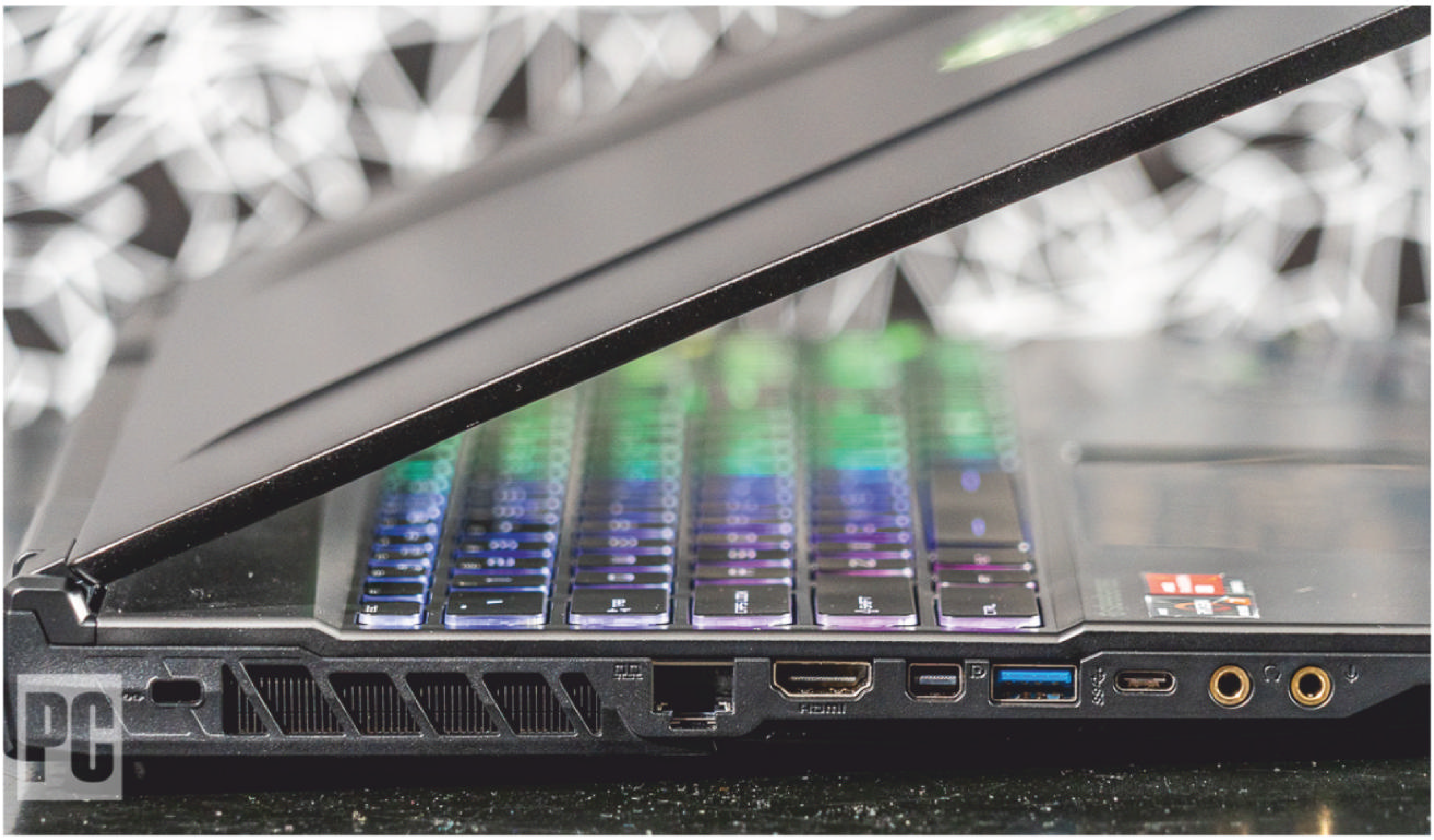
THE KEYBOARD: PER-KEY RGB BACKLIGHTING

Its SteelSeries-designed keyboard is one of the Alpha 15's high-end touches. It integrates with the SteelSeries Engine app for its per-key RGB backlighting and reprogrammable keys, features usually reserved for more expensive gaming notebooks. (The Omen 15 and Predator Helios 300 offer neither.)

The island-style keys have satisfyingly soft key presses and a font that says "gamer." Layout-wise, the keyboard is partially nonstandard since the arrow keys are forced into the main keyboard area, downsizing the right Shift and number pad 0 keys. (The Lenovo Legion 5i avoids this traffic jam by properly divorcing its arrow keys below the keyboard.) The Windows key is also located to the right instead of left of the space bar, though the MSI Dragon Center app lets you swap it with the Fn key if you wish. A maximum-cooling-fan button, a key to launch Dragon Center, and the power button sit above the number pad. Meanwhile, the traditional two-button touchpad offers a smooth surface and ample space, though its physical clicks are loud.

The Alpha 15's generous port selection includes four USB 3.2 Gen 1 ports (three Type-A and one Type-C), Ethernet, full-size HDMI and mini DisplayPort video outputs, separate headphone and microphone jacks, and a full-size SD card reader.

The ports are divided between the left and right sides, though some are positioned right up against the front edge (near the user) so plugged-in peripherals can protrude into external mouse or elbow-resting territory. Fortunately, the included power adapter has a right-angle connector to keep a low profile.

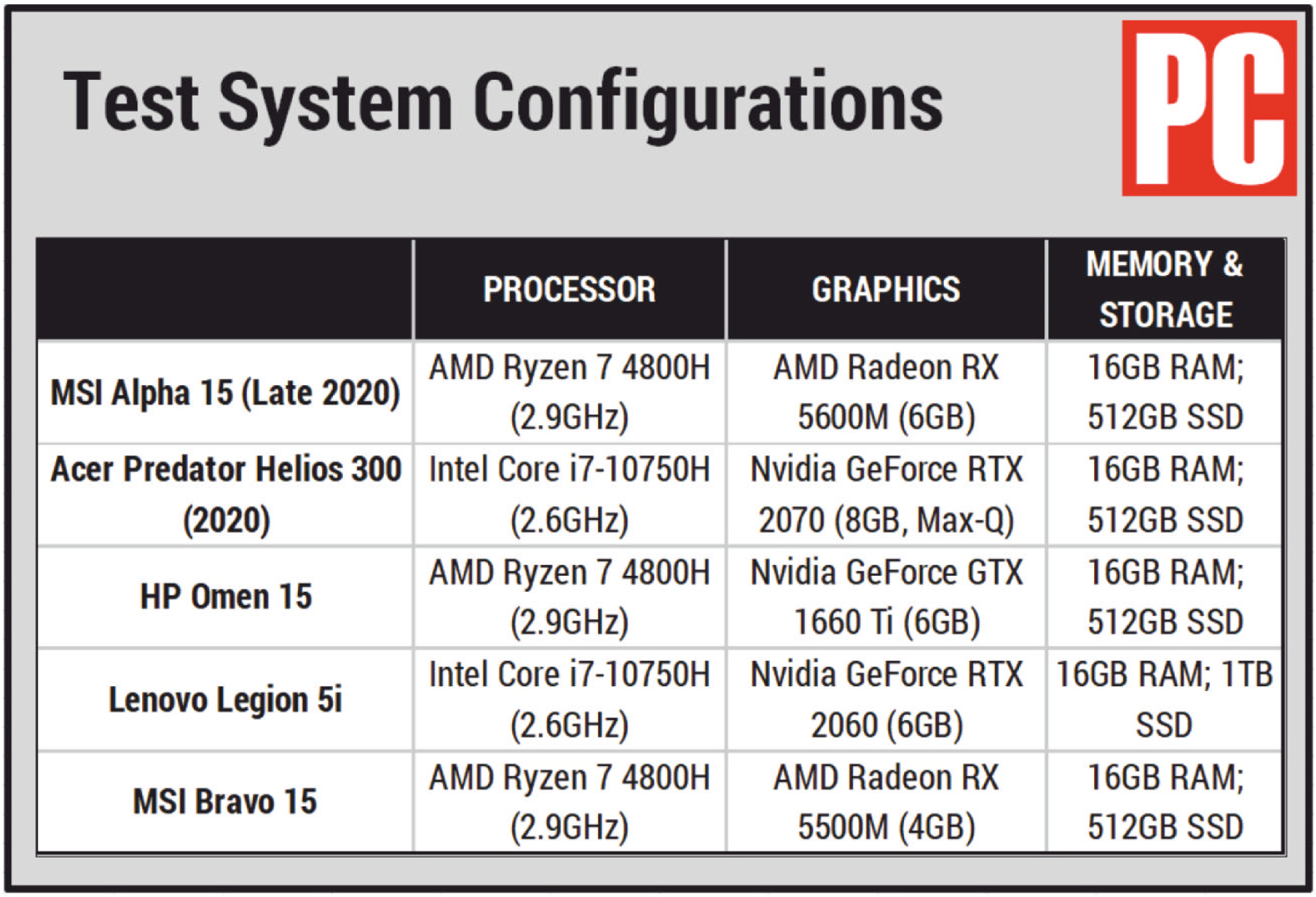


The Alpha 15 uses an Intel AX200 wireless card for Wi-Fi 6 and Bluetooth 5 connectivity, an upgrade over the original Alpha's previous-generation wireless standards. However, like most gaming notebooks, it still lacks a fingerprint reader and face-recognition webcam to support Windows Hello biometrics. The 720p webcam also delivers merely average quality, like most laptops' in this price range. The stereo speakers located beneath the palm rest are equally unremarkable with their bass-shy sound.

TEAM RED ON THE BENCH: TESTING THE ALPHA 15

The Alpha 15 model A4DEK-004US that I'm testing packs an eight-core AMD Ryzen 7 4800H processor, a 6GB AMD Radeon RX 5600M graphics card, 16GB of RAM, and a 512GB NVMe solid-state drive for its Windows 10 Home operating system. MSI backs it with a one-year warranty. The system was hard to find for sale as I typed this, though the close-cousin A4DEK-005US model (which doubles the SSD storage to 1TB) was available for $1,199 on Newegg with a $100 mail-in rebate that brought it to just $1,099. That's commendable hardware for the money.

For our performance benchmarks, I compared the Alpha 15 to the gaming notebooks listed below:



Test System Configurations

	PROCESSOR	GRAPHICS	MEMORY & STORAGE
MSI Alpha 15 (Late 2020)	AMD Ryzen 7 4800H (2.9GHz)	AMD Radeon RX 5600M (6GB)	16GB RAM; 512GB SSD
Acer Predator Helios 300 (2020)	Intel Core i7-10750H (2.6GHz)	Nvidia GeForce RTX 2070 (8GB, Max-Q)	16GB RAM; 512GB SSD
HP Omen 15	AMD Ryzen 7 4800H (2.9GHz)	Nvidia GeForce GTX 1660 Ti (6GB)	16GB RAM; 512GB SSD
Lenovo Legion 5i	Intel Core i7-10750H (2.6GHz)	Nvidia GeForce RTX 2060 (6GB)	16GB RAM; 1TB SSD
MSI Bravo 15	AMD Ryzen 7 4800H (2.9GHz)	AMD Radeon RX 5500M (4GB)	16GB RAM; 512GB SSD

The HP Omen 15 teams its Ryzen chip with a GeForce GTX 1660 Ti to make an ideal comparison with (and foil for) the Alpha 15's Radeon RX 5600M. The Acer Predator Helios 300 will show what a more expensive GeForce RTX 2070 (Max-Q) can do, while MSI's Bravo 15, another all-AMD model from earlier this year, uses an entry-level Radeon RX 5500M to save money. (It was $999 as tested.) Let's go.

Storage, Media, and CPU Tests: Our first test, UL's PCMark 10, assesses general system performance across different real-world productivity and content-creation workflows. The Alpha 15's score of 5,950 points is outstanding, far above the 4,000 points we like to see from high-performance PCs. The system's showing in PCMark 8's storage subtest is also competitive. (That said, most modern SSDs ace this test.)

Next up is a pair of CPU-crunching tests: Cinebench R15 stresses all available processor cores and threads while rendering a complex image, while in our Handbrake test, we transcode a 12-minute 4K video down to 1080p.

The Alpha 15 kept pace with the Omen 15 and Bravo 15, since all three use AMD's Ryzen 7 4800H CPU. The Intel-based Acer and Lenovo trailed.

The final test in this section is photo editing. We use an early 2018 release of Adobe Photoshop Creative Cloud to apply 10 complex filters and effects to a standard JPEG image, timing each operation and adding up the totals. This test is not as CPU-focused as Cinebench or Handbrake, bringing the performance of the storage subsystem, memory, and GPU into play.

The Predator Helios 300 and Legion 5i did better here mainly because of their higher-clocked Core i7-10750H chips, which top out at 5.1GHz; the Ryzen 7 4800H reaches just 4.2GHz. The "bursty" Photoshop test tends to reward machines that can ramp processing-intensive tasks up and down quickly. Nonetheless, the Alpha 15 still makes a powerful photo-editing platform.

Graphics Tests: Our first two benchmarks in this section measure the gaming performance potential of a PC. In UL's 3DMark, we run the Sky Diver (lightweight, capable of running on integrated graphics) and Fire Strike (more demanding, for high-end gaming PCs) subtests, both DirectX 11-based. Our other gaming simulation, Unigine Corp.'s Superposition, uses a different rendering engine to produce a complex 3D scene.

The Alpha 15 and Omen 15 slugged it out, though the Alpha took the lead in 3DMark Fire Strike. However, the Superposition 1080p benchmark shows their GPUs are neck and neck. Both were far ahead of the Bravo 15.

Next, we tried some real games. We use the built-in 1080p benchmarks of Far Cry 5 (at its Normal and Ultra presets) and Rise of the Tomb Raider (at its Medium and Very High presets). Far Cry 5 uses DirectX 11, while we flip Rise of the Tomb Raider to DirectX 12.

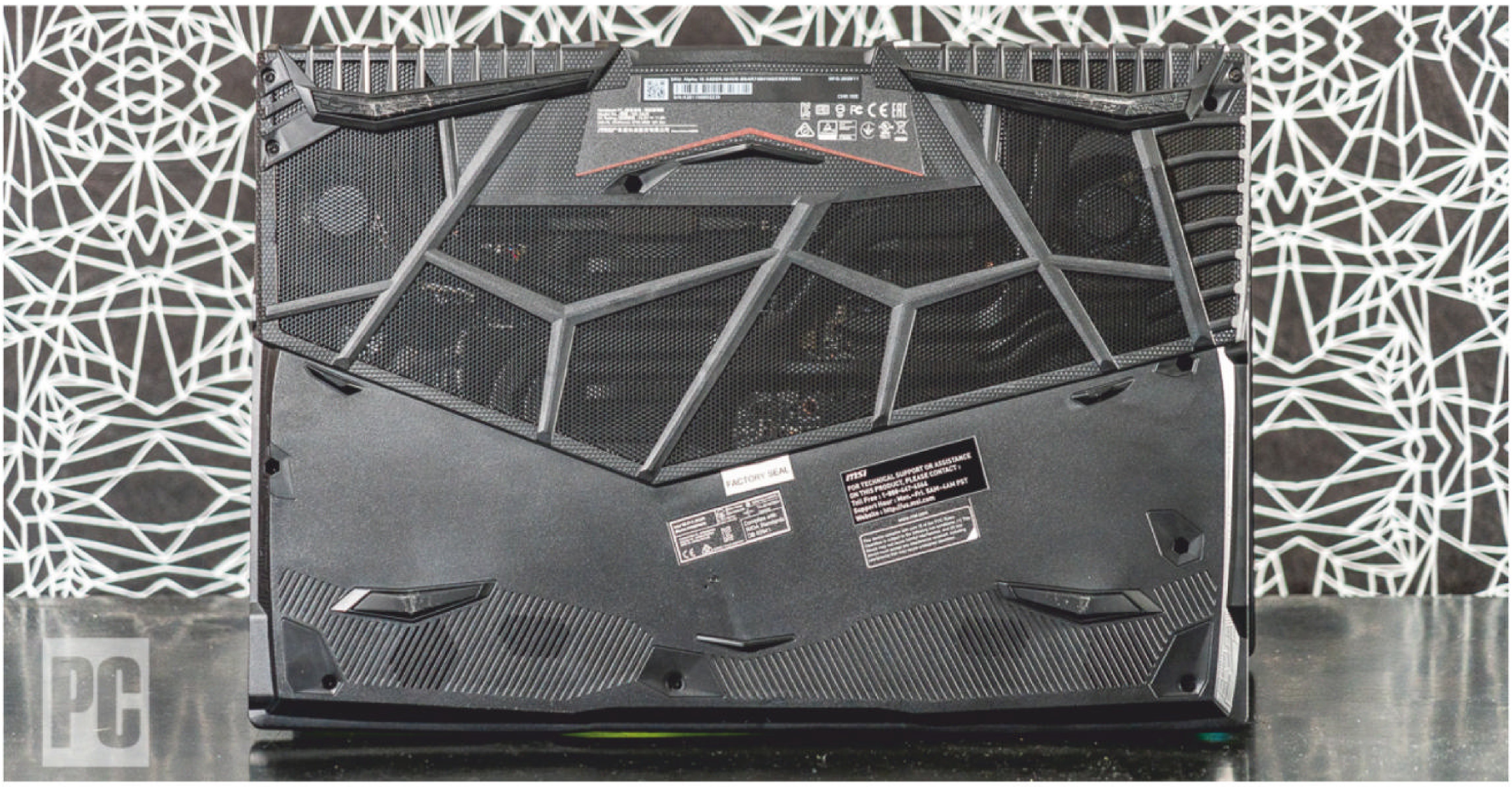
The stalemate between the Alpha 15 and Omen 15 continued; it's clear that the Radeon RX 5600M and GeForce GTX 1660 Ti are well matched. The GeForce RTX-equipped Predator and Legion performed slightly better.

As far as Intel versus AMD goes, the Core i7-10750H is just as capable of gaming as the Ryzen 7 4800H, though the AMD chip's two extra cores can be advantageous for livestreaming or recording gaming sessions. It's undoubtedly an all-around faster CPU.

Impressively, the Alpha 15 didn't get more than lukewarm on its top and bottom throughout my gaming sessions. Its processor and graphics card also stayed under their maximum rated temperatures—the Ryzen 7 4800H topped 86 degrees C while the Radeon RX 5600M reached just 68 degrees C.

That said, I wish the fans were quieter. It was easy to pick out the noise from across my living room while the Alpha 15 was running full tilt.

> **“As far as Intel versus AMD goes, the Core i7-10750H is just as capable of gaming as the Ryzen 7 4800H.”**



Battery Rundown Test: For our last benchmark, we measure a laptop's unplugged runtime while playing a locally stored video with screen brightness at 50 percent and audio volume at 100 percent. We use the notebook's energy-saving profile where available, turn off Wi-Fi, and even disable keyboard backlighting to squeeze as much life as possible out of the system.

The Omen 15 lasted another hour, but the nearly nine hours of the Alpha 15 is an excellent time for a 15.6-inch gamer. MSI deserves a shoutout for vastly improving the battery life versus last year's model, which lasted barely five hours in this same scenario.

WELL-PRICED AMD POWER, TAKE TWO

MSI's refreshed Alpha 15 is a much stronger performer with its eight-core Ryzen CPU and Radeon RX 5600M graphics card, as it's now able to go toe-to-toe with GeForce GTX 1660 Ti notebooks. It offers high-end features not often seen at its price point—a 144Hz FreeSync Premium screen and per-key RGB backlit keyboard—and showed impressive stamina in our battery test.

It's a little chunky and could use quieter cooling fans, but its low price makes those downsides easier to digest. Well-priced and well-rounded, the Alpha 15's value torch continues to burn brightly among upper-entry-level gaming laptops.

CHARLES JEFFERIES

Starts at $4.99 per month | EDITORS' CHOICE **Rating:** ●●●●○ EXCELLENT

TunnelBear VPN: It's Just Right

Too many security products have for too long relied on a hacker-esque "edginess" in their designs: Think neon-green text on a black background. TunnelBear VPN heads in the opposite direction, with bright colors, excellent design, and a cadre of cute but powerful bears. It's bursting with charm, yet it also delivers excellent security tools at a good price. It's a VPN that you'll actually enjoy using and an Editors' Choice winner, too.

What is a VPN? When your VPN is active, your web traffic travels through an encrypted tunnel to a server managed by the VPN service. That keeps your information safe from data thieves and other ne'er-do-wells lurking on public networks. It also helps protect against ISPs selling anonymized metadata about your web habits. When your traffic exits to the web through the VPN server, you appear to have an IP address at that server's location. This protects your real identity as you browse the web.

TUNNELBEAR PRICING AND FEATURES

TunnelBear is one of the few providers we've reviewed that offers a truly free VPN service. However, the free TunnelBear tier restricts you to only 500MB of data per month. You can earn more data by Tweeting about the company, which can raise your limit to a total of 1GB for one month. The free version of HotSpot Shield limits you to 500MB per day, while the ProtonVPN free subscription has no data limit.

If you decide to pay for TunnelBear, it won't break the bank. You can snag the Unlimited plan for $9.99 per month. That's slightly below average $10.21 per month for a VPN, and the quality of service makes it an even better value. Hotspot Shield, by comparison, costs $12.99 per month, while Mullvad is a mere $5.54 per month. TunnelBear also has longer term subscriptions, starting at $59.88 per year or $120 every three years. That's significantly less than the industry average of $71.87 per year.

While TunnelBear is an excellent value, we highly recommend starting with the company's free or monthly plans, so you can test out TunnelBear for yourself and make sure it will work for you. TunnelBear limits free users to 500MB of data per month, which is quite restrictive. ProtonVPN, notably, places no limit on the data of its free VPN subscriptions.

There is an added cost to that low price tag: TunnelBear doesn't offer much beyond VPN protection. Editors' Choice winners IVPN, NordVPN and ProtonVPN are among the few VPNs that offer multihop connections, which use a second VPN server for extra security. Several offer split tunneling, which allows you to designate which apps' traffic travels inside or outside the VPN connection. TunnelBear has none of these.

TunnelBear VPN

PROS Affordable. Excellent privacy policies. Annual independent audits. Friendly, approachable design. Browser extensions, including stand-alone ad blocker. Good speed test results. Bears.

CONS Lack of geographic diversity in server locations. Few advanced features.

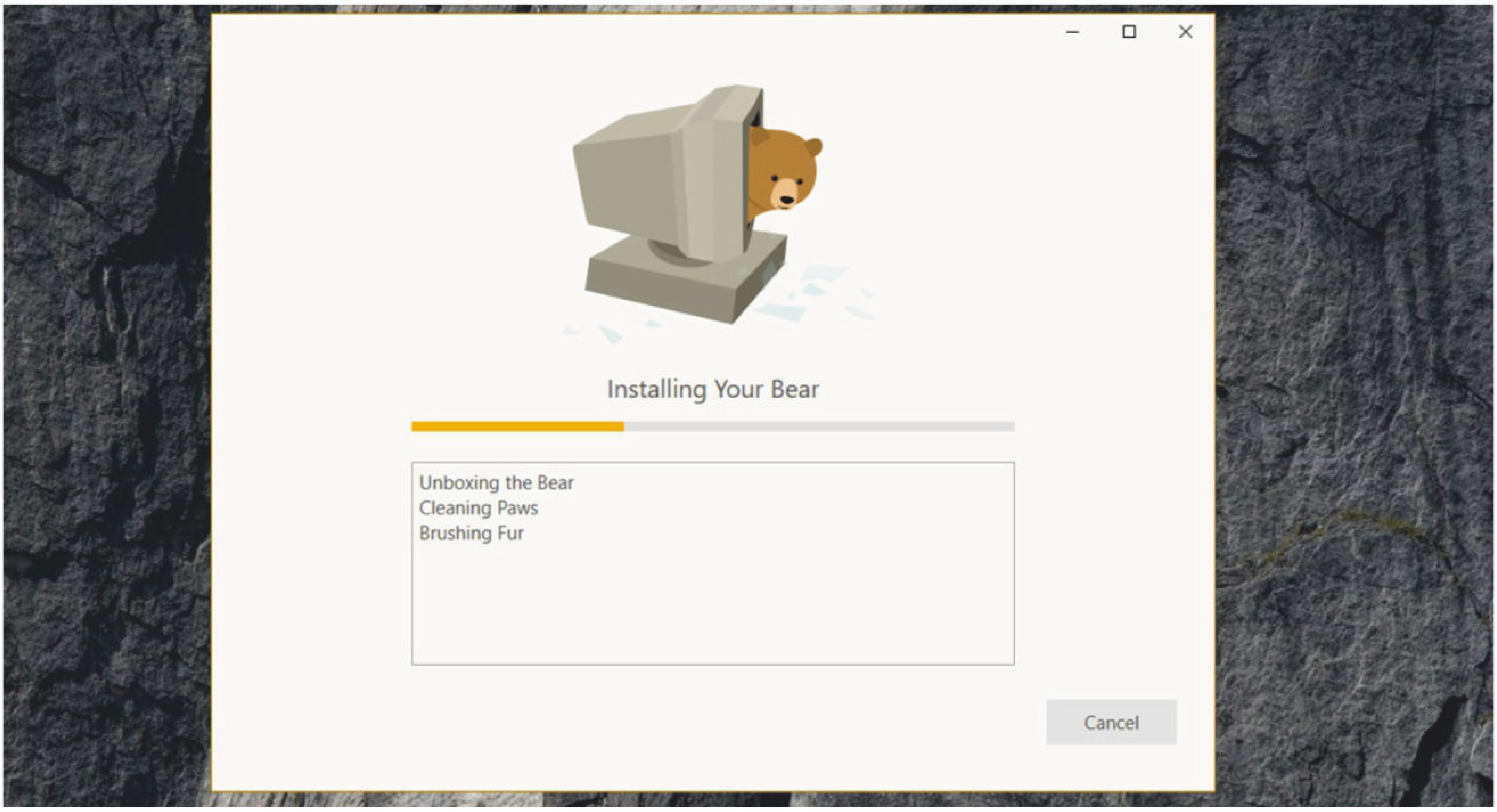
BOTTOM LINE If you're tired of edgy security products, let the strong-but-cute bears of TunnelBear VPN defend your web traffic. Easy to use and easily affordable, it's an Editors' Choice winner.

You can pay for TunnelBear using major credit cards. Bitcoin is an option, but only for the one-year plan. Other VPN services such as Editors' Choice winner Mullvad go further by accepting numerous payments, including cash.

With either a free or a paid account, you can use up to five devices on a single TunnelBear account. That's average for VPNs, but many services offer more. Some services, such as TorGuard, will let you purchase additional device connections using a sliding scale. Avira Phantom VPN, Encrypt.me VPN, Ghostery Midnight, IPVanish VPN, Surfshark VPN, and Windscribe VPN place no limit on the number of devices you can use simultaneously. (Note that IPVanish and Encrypt.me are owned by j2 Global, the parent company of PCMag's publisher, Ziff Davis.)

Previously, TunnelBear forbade the use of its services for P2P file sharing or BitTorrenting. Thankfully, those days are gone. You can now use it to torrent over VPN to your heart's content.

> **“While TunnelBear is an excellent value, we highly recommend starting with the company's free or monthly plan.”**



Installing Your Bear

Unboxing the Bear
Cleaning Paws
Brushing Fur

VPN PROTOCOLS

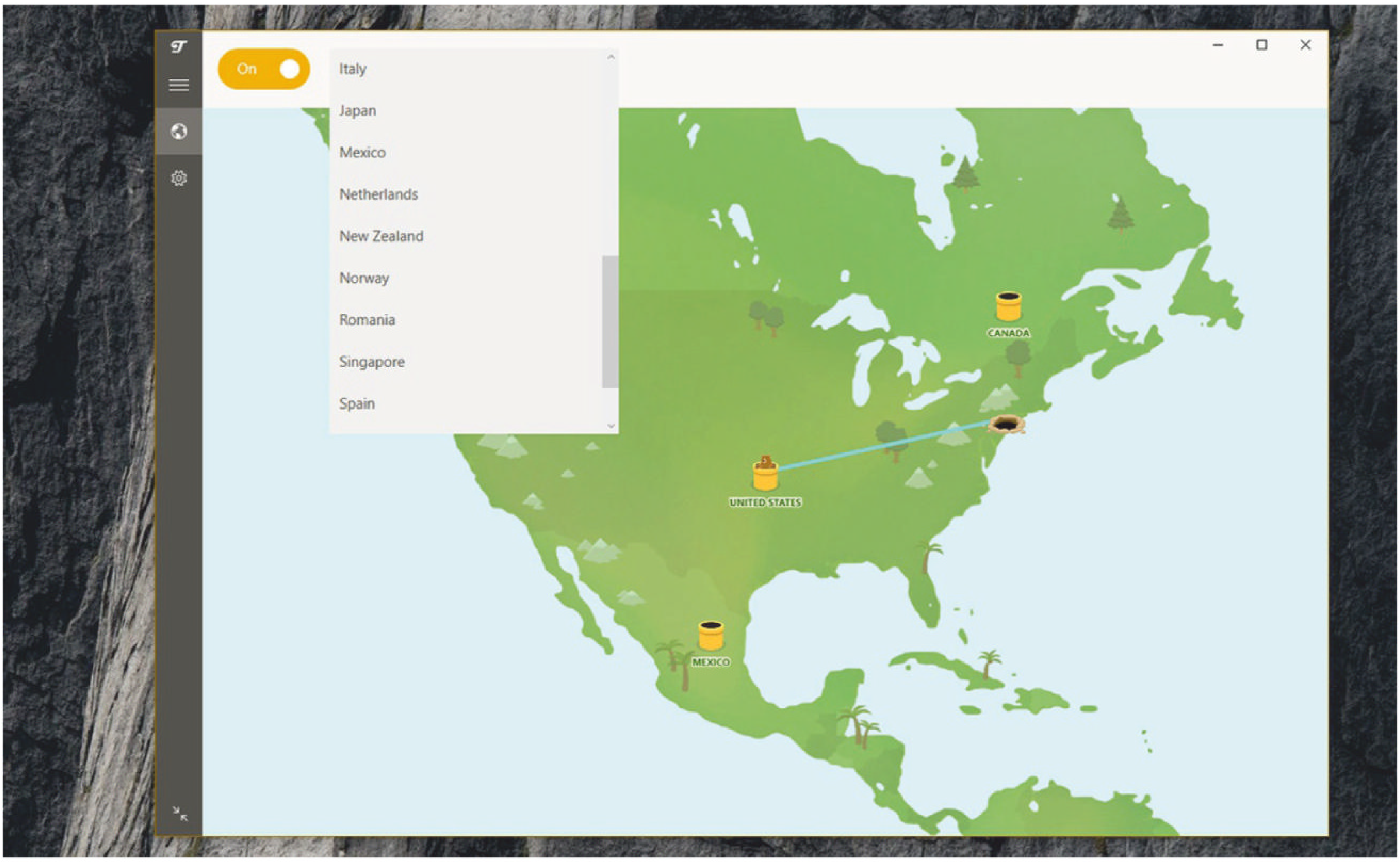
TunnelBear secures your connection with the OpenVPN protocol for Android, macOS, and Windows. This is our preferred protocol, as it is newer, faster, more secure, and open source.

The TunnelBear iPhone app, meanwhile, uses the IKEv2 protocol, which is a good option for that platform. IKEv2 is also available for the Windows and macOS clients. You can't change which protocol TunnelBear uses in its app, but that's fine for most users.

Some VPNs, including NordVPN and Mullvad, have begun deploying the next-generation WireGuard VPN protocol. While also open source, this super-fast VPN protocol is still very new. The fact that TunnelBear doesn't offer it isn't a problem. Yet.

SERVERS AND SERVER LOCATIONS

The more server locations a service has, the more options you have for spoofing your location. A lot of geographic diversity also means you are more likely to find a close-by server when traveling abroad, which will likely be faster and more resilient than a distant one would be.


On
Italy
Japan
Mexico
Netherlands
New Zealand
Norway
Romania
Singapore
Spain
CANADA
UNITED STATES
MEXICO

TunnelBear offers servers in 26 locations. This collection covers the essentials, and recently expanded to encompass more of South America, but is still on the low side. TunnelBear's offering completely ignores Africa and the Middle East, an omission that is, sadly, not unusual for VPN companies. ExpressVPN covers 94 countries and CyberGhost comes close behind with servers in 90 countries.

Total server count isn't really a good metric for quality. A large company with lots of subscribers will surely have more servers, and companies of all sizes will spin servers up and down as needed. That said, having more options is always a good thing.

At last count, TunnelBear has around 1,800 servers across the globe. That's a robust offering, besting the majority of VPN services, but it's not among the largest collection of servers. ExpressVPN, Hotspot Shield VPN, Private Internet Access VPN, and TorGuard VPN all offer more than 3,000 servers, and both CyberGhost and NordVPN boast over 5,000 servers.

Virtual servers are software-defined servers, which means several virtual servers can run on a single physical server. It also means that a virtual server can be configured to behave like it's located in one country, when it's actually in another. Sometimes, this is a good thing, because a server can be in a secure location while providing coverage to a nearby unsafe location. It becomes an issue when companies aren't transparent about where your data is headed.

TunnelBear told me that it has dedicated servers in all of its locations and uses virtual servers only to handle unexpected demand. Those virtual servers are located in the country they claim to be. If you're using TunnelBear, rest assured that your data is exactly where it's supposed to be.

In the wake of recent legislation within China, TunnelBear announced it was voluntarily suspending its servers in Hong Kong. The company stresses that all it does not store user information on these servers, and that the drives are encrypted. Other VPNs that have recently left the region have filled the gap with virtual servers that appear to be in Hong Kong but are actually outside of China. TunnelBear instead recommends that Hong Kong users connect to servers in nearby countries.

YOUR PRIVACY WITH TUNNELBEAR

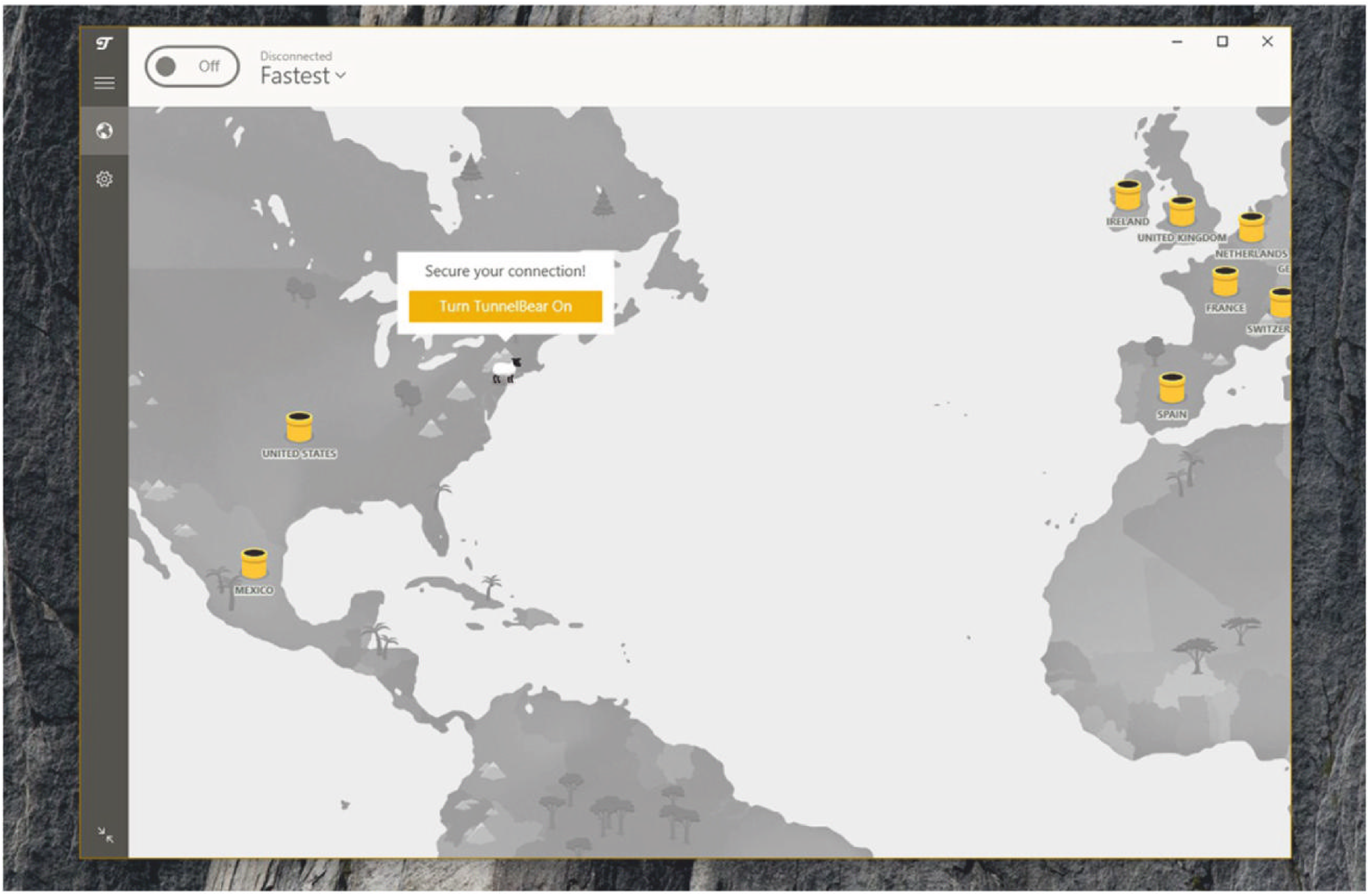
Beyond its cute and powerful bears, TunnelBear's greatest strength is its stance on privacy. It has one of the best privacy policies we have seen, explaining in great detail and with plain language, exactly what it collects and why. It also includes discussion sections, where the company explains how it arrived at a particular decision. For example, a pull-out section talks about how the company used to gather users' names to customize communications but decided that this information didn't need to be gathered or stored and that its loss could put customers at risk. Other VPN companies should take note of this approach.

> **Beyond its cute and powerful bears, TunnelBear's greatest strength is its stance on privacy.**

Notably, TunnelBear says that it will not disclose, sell, or trade personal information with third-party companies. TunnelBear does use third parties for payment processing, but this is not unusual. Additionally, a company representative confirmed to me that TunnelBear's only source of revenue is subscriptions—not data mining or ad retargeting. The company says it does not collect information about user activity, nor does it store originating IP addresses, timestamps, or DNS queries.

For free subscribers, it does record the overall bandwidth in order to enforce its data cap. This is reset to zero at the end of each month.

The company is based in Toronto, Canada, and incorporated in Delaware. It's owned by the antivirus company McAfee. Canada and the US do not have mandatory data retention laws. The company is subject to requests for data that a company like NordVPN, based in Panama, may not be. The company says it has legal teams for responding to requests for information but, "we have no information that can connect customers to usage, so we're unable to provide law enforcement with anything not in our Privacy Policy." The maintains a robust privacy report, which confirms it has not provided information to law enforcement beyond confirming an individual had an account with the company.



Secure your connection!

Off
Disconnected
Fastest
Turn TunnelBear On
IRELAND
UNITED KINGDOM
NETHERLANDS
GE
FRANCE
SWITZER
SPAIN
UNITED STATES
MEXICO

TunnelBear has the notable distinction of having completed not just one but three independent code audits and has publicly released the results of those audits. That's great, and I'm pleased to see that TunnelBear is committed to an annual public review process. A company representative described these audits to me as, "security audits of our whole stack, which includes our backend servers, our VPN servers and VPN clients."

Additionally, TunnelBear says that it has taken steps to limit the damage a successful attack on its server infrastructure might cause. The servers themselves contain no identifiable information about users, and the drives are encrypted. Some companies now run their servers "RAM only," and TunnelBear should consider doing the same. TunnelBear says it would "expedite the communication of any breach or risks" to its customers, should they occur.

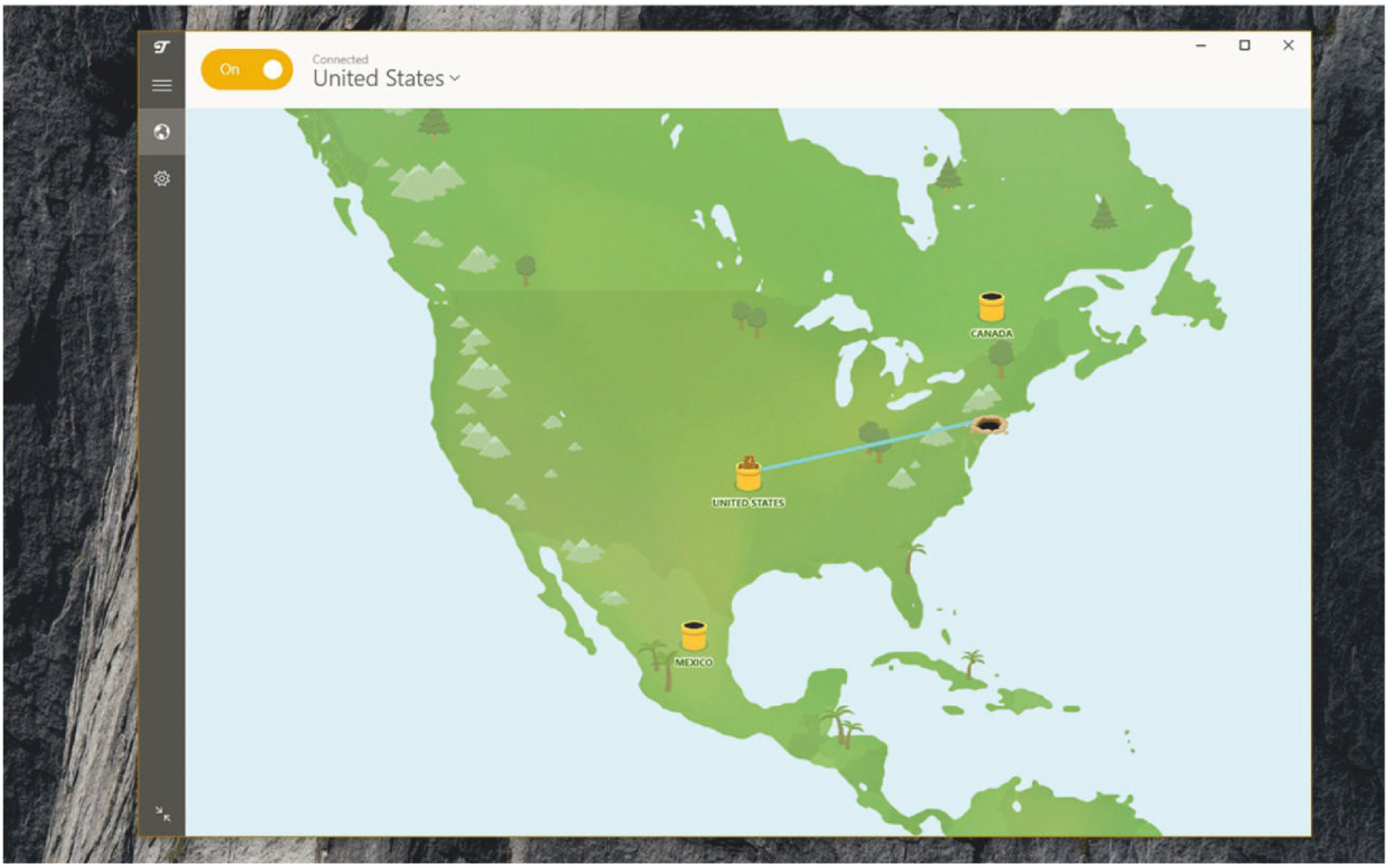
Security is really an issue of trust. Even if a company does everything right, it doesn't matter much if you, the customer, don't trust them. We recommend that consumers consider this information and choose a service with which they feel comfortable.

HANDS ON WITH TUNNELBEAR

When I went to sign up for a VPN for testing, I showed my partner all the top-rated services I had reviewed. I explained what I thought made the best the best, and then asked which my partner would actually use on a daily basis. They picked TunnelBear without missing a beat. We have used it ever since.

TunnelBear currently offers clients on Android, iOS, macOS, and Windows. For this review, we tested the Windows client on an Intel NUC Kit NUC8i7BEH (Bean Canyon) desktop running the latest version of Windows 10.

The TunnelBear client is quite charming, dressed in bold yellow. The app has a tongue-in-cheek attitude that it brings to every aspect of its app. It's cute and colorful, without ever being overbearing or cloying. For example, whenever you connect to a VPN server, a notification appears bearing a bear with a hat representative of that country.



The app is built around a central map of the world displaying the company's server locations, shown as Mario-esque pipes. Select your desired location from the menu above, switch protection on, and you're treated to a surprisingly smooth animation of a bear tunneling away from your current location. All the TunnelBear apps use the same design, so you'll have a familiar experience no matter where you go with TunnelBear.

> **"All the TunnelBear apps use the same design, so you'll have a familiar experience no matter where you go."**

As much as we love the TunnelBear apps, they have remained fairly static for several years. It would be nice to see them get a tuneup, without losing their panache in the process.

TunnelBear doesn't have many locations to choose from, but a location search box would be an excellent addition—as would a list of servers, with some basic information such as load and ping time. NordVPN and others provide detailed information about specific servers, which can be useful when you need a connection in a very specific location.

The TunnelBear app does include some advanced features, such as Trusted Networks, which is basically a whitelist of Wi-Fi networks you trust. Another important feature is Vigilant Mode. This prevents data from slipping through your internet connection during the seconds it takes TunnelBear to reconnect should you become disconnected. The GhostBear feature aims to circumvent VPN blocking by disguising VPN traffic as normal HTTPS traffic. A TunnelBear representative told me that the company advises that users switch on GhostBear only when absolutely necessary, as it can reduce performance. It's an impressive offering, but not unique. Many other companies offer similar custom tools designed to circumvent censorship.

One thing you don't want your VPN doing is leaking your personal information. When we test VPNs, we check to see if our test IP address changes and the name of our ISP is hidden, and we use the DNS Leak Test to see if DNS information is, well, leaking. TunnelBear passed all these tests easily, but it's possible other servers could be misconfigured.

TUNNELBEAR AND NETFLIX

While no one can tell you're a dog online (or a bear, for that matter), streaming companies such as Netflix can tell where you live and will block you when you're spoofing your location. That's because companies often have to honor geographic restrictions with the content they provide.

Unfortunately, when I tried to stream a movie from Netflix while connected to a TunnelBear VPN server, I was blocked. Although that was true when I tested the service, your mileage may vary—as is always the case when your try to use a VPN with Netflix.

BEYOND VPN

Most VPN companies that include ad blocking tend to do so on the network level, purporting to block the ads before they even reach your computer. TunnelBear doesn't do this. Instead, the company has launched a stand-alone browser plug-in called Blocker. This retains TunnelBear's trademark bears and charm and is surprisingly well polished for a Chrome plug-in.

We prefer this approach, since it gives users far more control over what is blocked and when. That's especially important because blockers can break elements in sites, making them virtually unusable. Sometimes, enduring a few ads is the price to pay to see a working site.

Similarly, TunnelBear launched a password manager called RememBear. It's free to use on one device, but if you want the convenience of syncing across all your devices, you'll have to pay $36 per year (or $60 every two years). A subscription to RememBear is bundled with the three-year TunnelBear subscription. We found it to be a good service that handles the basics in a fun, whimsical fashion, with plenty of animated bears. However, it lacks advanced password-management features such as two-factor authentication, secure sharing, and password inheritance.

TunnelBear also offers browser plug-ins for Chrome, Firefox, and Opera, which function as proxies to reroute your traffic through a TunnelBear server. This encrypts your browser traffic—and only your browser traffic—differently than the VPN app. It's useful because it offers protection for just about any device that can run a browser. It's not, however, a substitute for the service's complete VPN protection, which is what we test.

Other VPN companies have also begun diversifying their offerings. NordVPN also offers a password manager, and an encrypted file system called NordLocker. Hotspot Shield has one of the most intriguing bundles, bringing three different products for free through the company's Pango account.

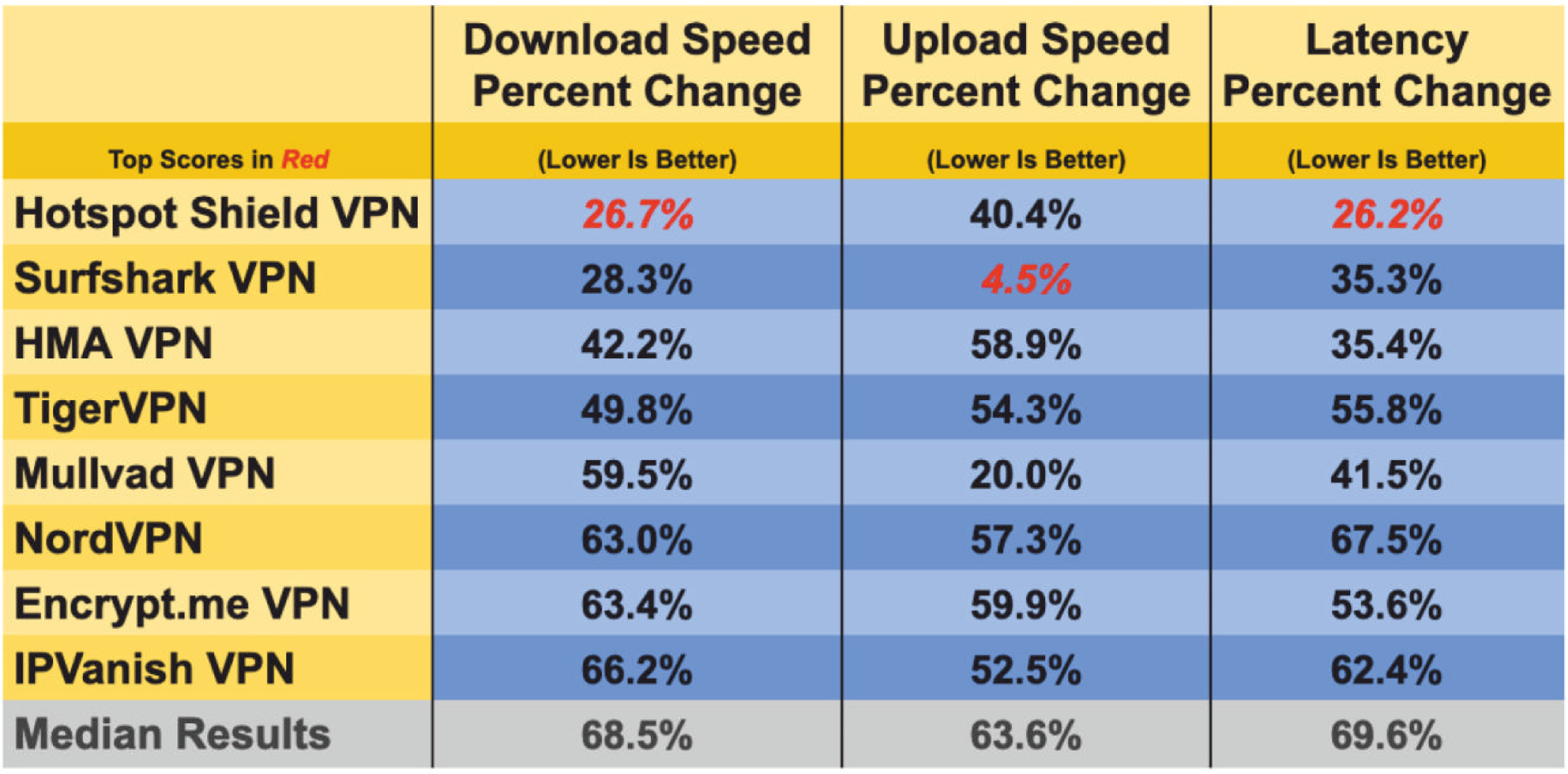
Many VPN companies are aware that their products are used to help bypass censorship, and work to support those efforts. TunnelBear has offered free bandwidth to users in specific countries and in 2020 it kicked off an increased focus on anti-censorship efforts.

SPEED TEST

No matter the VPN you choose, you'll see an impact on your web-browsing experience. That's because you're adding some extra hoops for your traffic to jump through. Speeds are a perennial concern for consumers, but we try and discourage anyone from using speed results alone as a benchmark for choosing a VPN service. At PCMag, we use the Ookla speedtest tool to gauge the impact a VPN has on performance. (Note that Ookla is owned by Ziff Davis, which also owns PCMag.) We have a whole feature on How We Test VPNs, so do read it for more on our methodology and the limits of our tests.

TunnelBear had a mixed showing in our tests. It reduced upload speed test results by 62.9 percent, which is better than the median for that category. It can't claim the same for download speed test results, which it decreased by 74.7 percent, or latency, which it increased by 96.5 percent. The high latency is not too surprising since TunnelBear has only a few US servers, meaning your data will likely travel further to stay within the US. Testing from New York, my traffic was sometimes routed to a Canadian server, probably because it was closer.

You can see how TunnelBear compares in the following chart with the top performers among the over 40 services we tested. These results are presented in descending order by download result.



Top Scores in *Red*	Download Speed Percent Change (Lower Is Better)	Upload Speed Percent Change (Lower Is Better)	Latency Percent Change (Lower Is Better)
Hotspot Shield VPN	*26.7%*	40.4%	*26.2%*
Surfshark VPN	28.3%	*4.5%*	35.3%
HMA VPN	42.2%	58.9%	35.4%
TigerVPN	49.8%	54.3%	55.8%
Mullvad VPN	59.5%	20.0%	41.5%
NordVPN	63.0%	57.3%	67.5%
Encrypt.me VPN	63.4%	59.9%	53.6%
IPVanish VPN	66.2%	52.5%	62.4%
Median Results	68.5%	63.6%	69.6%

Hotspot Shield VPN currently holds the title of fastest VPN, but Surfshark isn't far behind with a truly stunning upload speed test score. As mentioned earlier, however, we discourage people from focusing too much on speed, as it is difficult to measure and not nearly as important as a VPN's features or overall value. Keep in mind, too, that the performance you experience will likely differ greatly from mine.

THIS VPN IS JUST RIGHT

Increasingly, it seems like there are two options for security software: black, green and edgy, or blue and high-tech. TunnelBear dares to be lighthearted, yellow, and cute. The company has always put a premium on design and user experience, which is sorely needed in all of digital security. TunnelBear does all that while still offering a secure, simple product with a robust backbone.

What TunnelBear does right is make a security product you'll actually use. It's not a perfect product, but it's a product that perfectly fits into your life. It remains an Editors' Choice winner.

MAX EDDY

THE 60 BEST WORK-FROM-HOME CITIES

BY SASCHA SEGAN & KIM KEY

Looking to leave your cramped, expensive living space and work from home permanently? We've done the research, and these are the US and Canadian cities that provide the best balance of affordability, livability, and connectivity.

The COVID-fueled remote-work boom is driving many North Americans to find new, more affordable homes. In November, rents for studio apartments in San Francisco plummeted by 35% year over year, according to The Real Deal; rents on high-priced apartments in New York City are also falling, *The New York Times* reported.

If you can work anywhere, though, where should you go? We gathered data from Ookla Speedtest, BestPlaces.net, and BroadbandNow to find 50 US and 10 Canadian towns and cities with affordable housing, great gigabit internet connections, and remote-friendly lifestyles. Our list contains big cities, suburbs, and small towns, all with median house prices under $500,000—and even some under $100,000. San Francisco, New York, Toronto, and Vancouver didn't make the list. [Note: Ookla Speedtest and PCMag are both owned by J2.]

Remote work isn't a brand-new phenomenon; the number of people working from home has been trending upward for years. The US Census has reported an increase in work-from-home folks every year since 2010, growing from 4.3% of Americans in 2010 to 5.7% in 2019. But of course, the pandemic accelerated that growth. By mid-June of 2020, Statista reported, up to 11.2% of workers in various industries were staying home, and 22% of workers said they'd be interested in working from home permanently.

Canada reacted more quickly and intensely to the pandemic than the US did. By May, Statistics Canada estimated that in theory, 38.9% of Canadians could work from home, and that during the country's March lockdown, just about that many were at home. Remote-worker jobs, as expected, cluster in information- and communication-based industries.

"Most jobs in finance and insurance (85%), educational services (85%), and professional, scientific and technical services (84%) can potentially be performed from home while those in accommodation and food services (6%) and agriculture, forestry, fishing and hunting (4%) have almost no telework capacity," Statistics Canada said.

> **By mid-June of 2020, Statista reported, up to 11.2% of workers in various industries were staying home.**

GET THE GIG

To gauge the remote-working potential of towns, we started with gigabit connections. BroadbandNow says that about 56% of the US can get gigabit internet now, but it's not always affordable, and it doesn't always give you the upload speeds you need for true remote working.

Fiber internet is the gold standard, in part because it's more often symmetrical: Many cable service plans offer massively better download speeds than upload speeds. They generally advertise only their download speeds, which made more sense when the internet world was watching a ton of Netflix but not doing as much two-way video calling.

ISPs may have had another reason not to particularly prioritize uploads: Before COVID-19, BitTorrent made up 27% of global upstream traffic, according to Sandvine. BitTorrent is a headache for ISPs because it is frequently used to share copyrighted media.

The pandemic changed that game. According to a May report from Sandvine, between Feb. 1 and Apr. 19 of 2020, upstream traffic increased by 121%, while downstream traffic increased by only 23%. All of your Zoom calls and Google file uploads make it more important than ever to have fast and reliable upload speeds.

Do you need gigabit internet for work and school? According to specs, not really. Four Zoom streams need a total of only 12Mbps up and down, according to Zoom. Various sites estimate a 4K video stream to consume about 25Mbps of bandwidth; Google Stadia wants 35Mbps for 4K HDR. So in theory, a 100Mbps internet connection should be fine for most families.

That's not always the case, for various reasons. Cable and wireless connections can get congested when lots of people are using them, delivering less than their stated potential. In a connected home, background tasks on multiple smartphones and PCs can also eat up bandwidth. That's why we designated gigabit internet, with at least 800Mbps tested downloads and 200Mbps tested uploads, as our gold standard for a remote-working city.

BEST OF THE BEST

Our number-one remote-working town in the US is Chattanooga, known as "Gig City," which rolled out a citywide fiber network in 2010. As we recounted in a 2018 feature, Chattanooga has been pushing hard to attract tech workers and companies based on its affordable real estate, business-friendly administrations, and widely available broadband internet. In 2019, according to the Census, 6.8% of Hamilton County, TN residents worked from home, compared with 5.7% of all Americans.

“In 2020, it was evident that Chattanooga has been able to attract talent from major cities and companies. I’ve run into folks who work for Spotify, Stripe, Netflix, et al. The quality of life was a major reason many of these folks moved from places like NYC, SF, LA, and more,” Chattanooga venture capitalist Santosh Sankar told us.

Southern Vermont locales also place highly in our ranking, with Pawlet at number four and Springfield at number 10, thanks to the efforts of the Vermont Telephone Company to revitalize 14 villages by wiring them with fiber. (Nearby Mount Holly would also have placed on the list, but it was too close to the other two towns.) Vtel’s president, Michael Guite, said the company started by wiring the local library with fiber in 2008 and then took its connections to 18,000 homes by 2016.

Matt Dunne, the executive director of the local Foundation for Rural Innovation, said potential Vermonters should look beyond the well-known, hipper towns to find values in Vtel’s service area. “Springfield actually has a lot of beautiful buildings available for purchase. Places more associated with resorts or second homes have more of a housing crunch,” he said.

Our list prioritizes places with large homes (such as number five, Kaysville, UT, where the average home has 8.2 rooms), but that’s not what everyone’s looking for. Remote worker Catherine Gellatly, for instance, prioritizes access to nature. She splits her time working for the New York Code & Theory between her 450-square-foot Vermont house and BRIC, a co-working space in Springfield. “I have found working from BRIC to be the best way for me to keep my home and work lives enjoyable and the boundary less blurred,” she said.

The Workhorse space in Chattanooga provides gigabit internet and a desk for $57 per month—a tiny fraction of the $520 per month WeWork charges at their space nearest PCMag’s former office in Manhattan. Even Chattanooga’s fancier Society of Work charges only $150 per month.

Smaller cities and towns dominate our list, but two big cities, Philadelphia (11) and Phoenix (37), made the cut. Philadelphia, home to cable provider Comcast, is a destination for New Yorkers looking for lower-cost living in a similar city atmosphere, according to a local CBS report from September.

If a particular part of the country appeals to you, check out some of the towns near our top choices. Lenexa, KS (35), was just the top one of many Kansas City suburbs that could have made our list. Montour Falls, NY (41), is one of several towns in the beautiful Finger Lakes region served by a fast, affordable local ISP, Empire Access.

IF CANADA'S YOUR HOME...

In Canada, Atlantic Canada provides the best value for your loonie. The Francophone town of Dieppe, New Brunswick, just across the river from Moncton, scores at the top of our Canadian list, with several suburban parts of Halifax (2) coming just behind. Their strength is the combination of much lower real estate prices than Canada's major centers and the availability of Bell's superior 1.5Gbps Fibe Internet.

"We launched Gigabit Fibe Internet service in more than 100 communities across Atlantic Canada in the fall of 2015, boosting speeds to 1.5Gbps in 2018. We now reach nearly 100% of homes and businesses in Dieppe and about 90% throughout [Halifax] with direct connections to our all-fiber network. Subscribers have increased almost tenfold in the last three years, with Gigabit+ subscriptions more than doubling," Bell's Nathan Gibson told us.

Diversity is a big strength in the greater Moncton area, where Venn Innovation runs a "clubhouse" for a tech sector that started out with companies in the gambling industry and then expanded to call-center and back-office businesses after fiber came to town.

"Atlantic Canada has been very aggressive going after that international talent," said Doug Robertson, Venn's CEO. "You can see the diversity out on the streets, you can see it in businesses, and you can see it in educational institutions. The Greater Moncton area is more diverse because of its linguistic duality and the history of its strong French-English balance."

Ready to pack up? Browse through our 60 city and town profiles to see what appeals to you. (Note that all broadband prices are per month.)

METHODOLOGY: HOW WE RATED TOWNS

We started with a few lists. One list, from Ookla Speedtest, had cities where the experts at Speedtest found common or frequent home gigabit internet usage in their crowdsourced database. Just having gigabit available wasn't enough to qualify; Ookla required evidence that a significant number of households were receiving and using true gigabit speeds. I folded in our 25 best cities and small towns for remote working from preliminary stories we wrote last year, along with a few other places suggested by our editors. I removed places that weren't actually towns: military bases, for instance, and church communities.

BestPlaces.net ranks US cities and towns based on amenities and attractive factors. Its data includes median home values, whether the city is near a coastline or mountains, and coffee shops, parks, and non-chain restaurants in the area.

BroadbandNow is the nation's best website for comparing broadband prices. It gave us the names of gigabit home broadband providers in each town and their lowest monthly fees.

The US Census American Community Survey measures many aspects of American living. The 2018 5-year ACS tables provided the median home size, percentage of home-based workers, and percentage of people in the arts, education, and healthcare. If the Census did not have data for a place, we took the data for the five-digit ZIP code assigned to that place.

Here's why we chose the criteria we used. First, we included only those cities with median home values below $500,000. If you want to find a beautiful, expensive house in cities on our list, you can; we just wanted to make sure they also have affordable housing.

We then put the whole thing into an Excel blender. The points were added up and the locations were ranked on their total scores.

Some "municipalities" are, for all intents and purposes, just neighborhoods in a larger city that for some reason kept their technical independence. We excluded any such location whose larger neighbor was not also on the list.

If two places on the list were within 50 miles of each other, we consolidated or eliminated adjacent places. That gave us some more geographic diversity and prevented the list from being cluttered by a cluster of similar small municipalities near one another.

Photo credit: Kevin Ruck / shutterstock.com

1. CHATTANOOGA, TN

Lowest cost for gigabit broadband: $60
Provider: AT&T Fiber
Median home price: $186,500
Median home size: 5.2 rooms
Coffee shops per 100K: 27
Parks per 100K: 14
Non-chain restaurants: 74%
Workers in arts and education: 8.4%
Health care practitioners: 4.5%
Workers at home: 4.7%

The American South boasts many grand old cities with rich histories, but Chattanooga is number one on our list. It's also known as Gig City: Chattanooga was the first US city to roll out a citywide gigabit network, and it's become a major tech hub since then. But it's also on top thanks to its low cost of living and array of family-friendly attractions. The city is home to the Tennessee Aquarium, the Bluff View Art District, and the Chattanooga Choo Choo, a popular community known for its restaurants and live music.

Photo credit: Sundry Photography / shutterstock.com

2. BEAR VALLEY SPRINGS, CA

Population: 5,389
Lowest cost for gigabit broadband: $60
Provider: Race Communications
Median home price: $357,800
Median home size: 6 rooms
Coffee shops per 100K: 18
Parks per 100K: 15
Non-chain restaurants: 74%
Workers in arts and education: 10.1%
Health care practitioners: 7.7%
Workers at home: 12.8%

If you're looking to make a mountain retreat your new home, consider Bear Valley Springs, a private, gated community nestled in the Tehachapi Mountains. According to Wikipedia, this town offers pleasantly cooler weather than surrounding places during the summer; you'll definitely see snow in the winter. You can also take a look at nearby Stallion Springs and Golden Hills for remote-working arrangements. The population is just under 5,400, and many residents are retirees.

Solon
FRAMING

Photo credit: Robert Nickelsberg / Gettyimages

3. PAWLET, VT

Population: 1,344
Lowest cost for gigabit broadband: $70
Provider: Vermont Telephone Company
Median home price: $221,500
Median home size: 6 rooms
Coffee shops per 100K: 32
Parks per 100K: 22
Non-chain restaurants: 90%
Workers in arts and education: 16.4%
Health care practitioners: 2.5%
Workers at home: 11.1%

The gorgeous Taconic Mountains in Vermont are hiding a gem of a country town called Pawlet, which offers incredible mountain views and quiet country living. Its population is just 1,344 people, so you're certain to get to know your neighbors fast. The town is home to 22 parks and 32 coffee shops, and most of the restaurants are independently owned. Also consider nearby Springfield and Mount Holly, highly rated southern Vermont towns serviced by Vermont Telephone Company (VTel) for broadband connectivity.

Photo credit: Parker Covieo / shutterstock.com

4. KAYSVILLE, UT

Population: 30,328
Lowest cost for gigabit broadband: $55
Provider: Veracity Networks
Median home price: $441,600
Median home size: 8.2 rooms
Coffee shops per 100K: 17
Parks per 100K: 18
Non-chain restaurants: 69%
Workers in arts and education: 10.3%
Health care practitioners: 3.8%
Workers at home: 7.5%

Known as “Utah’s Hometown,” Kaysville is home to over 30,000 people. You get fantastic mountain views and proximity to Salt Lake City in case you need to experience some city life. The nearby towns of Centerville and Morgan are also great places to live. Kaysville is part of the Ogden-Clearfield metro area, and the massive Hill Air Force Base is a major employer in the area. Median home sizes are a generous 8.2 rooms, and the prices reflect this; the average home cost is $441,600.

Photo credit: Nolichuckyjake/shutterstock.com

5. JONESBOROUGH, TN

Population: 5,275
Lowest cost for gigabit broadband: $60
Provider: AT&T Fiber
Median home price: $198,400
Median home size: 5.5 rooms
Coffee shops per 100K: 21
Parks per 100K: 13
Non-chain restaurants: 71%
Workers in arts and education: 14.4%
Health care practitioners: 3.7%
Workers at home: 8.7%

A picturesque mountain town filled with local shops, eateries, and other small businesses, Jonesborough calls itself the “storytelling capital of America.” It’s home to both the National Storytelling Festival and the International Storytelling Center, letting it punch far above its weight in terms of culture and quirk. “Tennessee’s oldest town,” founded before it achieved statehood, has a beautifully preserved downtown, with antique shops, independent coffee shops, a farmer’s market, and a distillery. It’s rich with handsome homes and Appalachian culture.

Photo credit: Laurent Fady/ shutterstock.com

6. PETOSKEY, MI

Population: 5,696
Lowest cost for gigabit broadband: $100
Provider: Truestream
Median home price: $250,600
Median home size: 5.5 rooms
Coffee shops per 100K: 82
Parks per 100K: 55

Non-chain restaurants: 90%
Workers in arts and education: 11.2%
Health care practitioners: 6.5%
Workers at home: 7.3%

People are plenty passionate about pleasant Petoskey, a coastal resort in northern Michigan with a preserved Victorian downtown, beaches, and boating. The city's name comes from the Odawa language and means "where the light shines through the clouds." That's a fine description of Petoskey, which is home to some of Michigan's best ski slopes in the winter and summer fun on the beaches along Little Traverse Bay. And it's close to Traverse City, called one of the "best small towns in America" by *Architectural Digest*. Petoskey is expensive for northern Michigan—so expensive that the local low-wage workers can't afford to live there—but it's still more affordable than many of the coastal cities from which tech workers may be coming.

Photo credit: woodsnorthphoto/ shutterstock.com

7 .TURTLE CREEK, PA

Population: 5,281
Lowest cost for gigabit broadband: $80
Provider: Verizon Fios
Median home price: $58,300
Median home size: 5 rooms
Coffee shops per 100K: 38
Parks per 100K: 14
Non-chain restaurants: 84%
Workers in arts and education: 6.5%
Health care practitioners: 1.8%
Workers at home: 6.7%

Pittsburgh has evolved into a tech-savvy, artsy city, and the eastern suburbs are some of the least expensive places to live in the area, including Turtle Creek but also Monroeville and North Versailles. If you choose to work remotely out of Turtle Creek, you'll be just 12 miles away from downtown Pittsburgh for a fraction of the cost of living inside the city proper. Even closer is the college-town ambiance around Carnegie-Mellon University and University of Pittsburgh, among other top schools. There are plenty of coffee shops and independent restaurants to choose from right in Turtle Creek as well.

Photo credit: Edgar Lee Espe/ shutterstock.com

8. BEMIDJI, MN

Population: 14,803
Lowest cost for gigabit broadband: $65
Provider: CenturyLink
Median home price: $136,200
Median home size: 4.9 rooms
Workers in arts and education: 1.5%
Health care practitioners: 4.8%
Workers at home: 7.5%

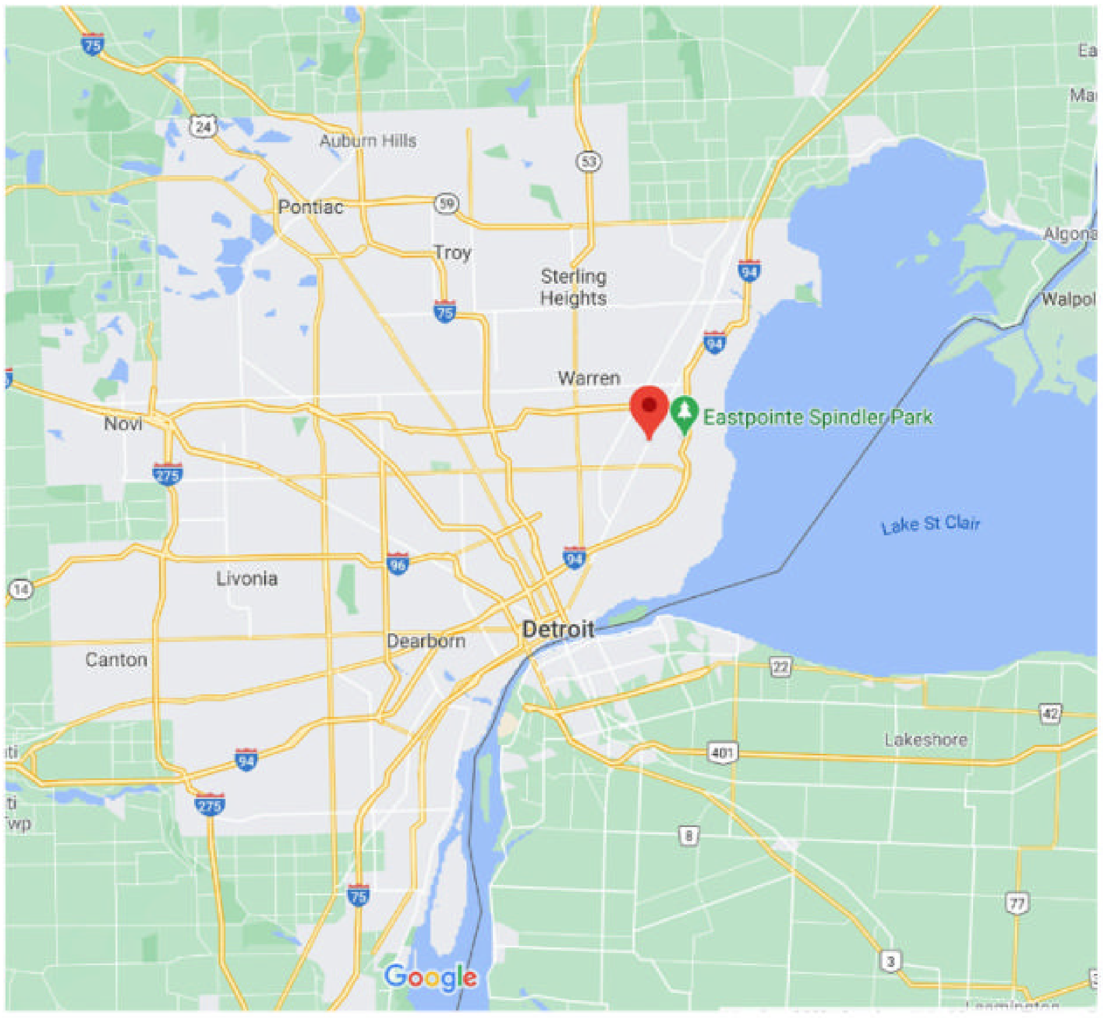
Tall trees and tall tales abound in Bemidji. Located in northwest Minnesota, it's known as the first city along the Mississippi River and is home to the tall tales of Paul Bunyan and his friend Babe the Blue Ox. The town has an 18-foot tall statue of the lumberjack standing beside the shores of beautiful Lake Bemidji. The city's downtown area features an array of small businesses; it's home to live theater, art galleries, a local brewery, and outdoor adventures at Itasca State Park, just 25 miles away.

Photo credit: bakdc/ shutterstock.com

9. SPRINGFIELD, VT

Population: 9,086
Lowest cost for gigabit broadband: $70
Provider: Vermont Telephone Company
Median home price: $133,700
Median home size: 5.8 rooms
Coffee shops per 100K: 45
Parks per 100K: 36
Non-chain restaurants: 94%
Workers in arts and education: 5.1%
Health care practitioners: 2.1%
Workers at home: 4.2%

Located in southeastern Vermont, Springfield is on the border of New Hampshire. The lovely Black River flows right through the downtown area, and from Hartness State Park to Hoyt's Landing, there are plenty of beautiful outdoor areas to explore in Springfield. It also has a thriving tech community and a co-working space called the Black River Innovation Campus. In 2007, the town was chosen to host the premiere of *The Simpsons Movie,* which is set in a fictional town named Springfield. The median home price is $133,700, and the median home size is 5.8 rooms. You can get gigabit internet in this small town for $70 a month via the Vermont Telephone Company.


Auburn Hills
Pontiac
Troy
Sterling Heights
Warren
Eastpointe Spindler Park
Novi
Livonia
Dearborn
Detroit
Canton
Lake St Clair
Lakeshore
Algonac
Walpol
Google

10. EASTPOINTE, MI

Population: 32,601
Lowest cost for gigabit broadband: $60
Provider: AT&T Fiber
Median home price: $104,700
Median home size: 5.5 rooms
Coffee shops per 100K: 19
Parks per 100K: 12
Non-chain restaurants: 75%
Workers in arts and education: 3.8%
Health care practitioners: 2.1%
Workers at home: 3.6%

Proudly calling itself the “Gateway to Macomb County,” Eastpointe is a suburb in the Metro Detroit area. It’s close to Warren, Rosewood, and Sterling Heights, which are also great living options. And it’s near outdoor attractions including Lake St. Clair and Metropolitan Beach. Residents can take advantage of 12 parks and 19 coffee shops. Perhaps most enticing are the low living costs, with a median home price of just $104,700; AT&T Fiber provides gigabit broadband internet for just $60 a month.

Photo credit: f11photo/ shutterstock.com

11. PHILADELPHIA, PA

Population: 1,569,657
Lowest cost for gigabit broadband: $60
Provider: RCN
Median home price: $191,100
Median home size: 5.6 rooms
Coffee shops per 100K: 42
Parks per 100K: 11
Non-chain restaurants: 90%
Workers in arts and education: 8.2%
Health care practitioners: 4.9%
Workers at home: 3.8%

If you're not ready to give up city living but want an alternative to New York City or Washington D.C., Philadelphia might fill the bill. You can enjoy the historical fascination of living near the birthplace of the US, the many excellent museums, and the city's thriving art scene. Philly also has a rich culinary history that goes beyond cheesesteaks at Pat's or Geno's, and the impressive number of non-chain restaurants in the city reflects this history. Philadelphia is home to a very diverse population, though it's also notorious for segregation. The median home price is $191,100, but you'll likely pay more to live in attractive neighborhoods like Old City, Society Hill, Queen Village, Rittenhouse Square, Manayunk, and Chestnut Hill.

LENEXA
CITY
CENTER

Photo credit: Jon Kraft/ shutterstock.com

12. LENEXA, KS

Population: 52,030
Lowest cost for gigabit broadband: $60
Provider: AT&T Fiber
Median home price: $323,000
Median home size: 6.5: rooms
Coffee shops per 100K: 24
Parks per 100K: 23
Non-chain restaurants: 70%
Workers in arts and education: 8.1%
Health care practitioners: 6 %
Workers at home: 6.4%

Folks seem to be happy to live in Lenexa: The community's government was ranked in the top 10% of the nation based on local satisfaction, according to the ETC Institute, a market research organization. Lenexa is a suburb of Kansas City, Missouri, which is known for great connectivity thanks to Google Fiber, and it boasts a vibrant tech community. Even better, the city hosts The Great Lenexa Barbecue Battle annually. Other nearby possibilities include Raytown, Gladstone, and Kansas City, Kansas.

Photo credit: Richard Cavalleri/ shutterstock.com

13. MIAMI LAKES, FL

Population: 31,032
Lowest cost for gigabit broadband: $60
Provider: AT&T Fiber
Median home price: $419,200
Median home size: 5.5 rooms
Coffee shops per 100K: 35
Parks per 100K: 15
Non-chain restaurants: 86%
Workers in arts and education: 7.3%
Health care practitioners: 6.6%
Workers at home: 6.2%

A suburb in the Miami metro area, Miami Lakes is known for its large estate lots and low crime rate. The town features tree-lined streets along with man-made lakes and canals. While it's just 34 minutes away from Miami Beach, with its world-class beaches and nightlife, Miami Lakes still maintains a "small town" feel. The median home price is $419,200, and you can choose from 35 coffee shops when you need a break from your home office.

Photo credit: Jacob Boomsma/ shutterstock.com

14. FORT COLLINS, CO

Population: 159,150
Lowest cost for gigabit broadband: $65
Provider: CenturyLink
Median home price: $428,400
Median home size: 5.6 rooms
Coffee shops per 100K: 51
Parks per 100K: 18
Non-chain restaurants: 79%
Workers in arts and education: 11.9%
Health care practitioners: 4.0%
Workers at home: 6.9%

Just a short drive from Denver, Fort Collins is home to Colorado State University and many tech companies. It's filled with pubs and boutiques and is close to incredible mountains, lakes, and rivers. If you're the outdoorsy type, you'll love Fort Collins, which consistently ranks among the healthiest cities in the United States. Home prices are also cheaper than in nearby Denver or Boulder, with a median home price of $428,400.

Photo credit: Freddie Meagher/ shutterstock.com

15. SAINT PAUL, TX

Population: 1,038
Lowest cost for gigabit broadband: $60
Provider: Grande Communications
Median home price: $336,800
Median home size: 7.1 rooms
Coffee shops per 100K: 23
Parks per 100K: 12
Non-chain restaurants: 76%
Workers in arts and education: 9.0%
Health care practitioners: 6.6%
Workers at home: 10.2%

If the thought of a quiet rural setting in Texas appeals to you, check out the area northeast of Dallas. On the edge of lovely Lavon Lake is Saint Paul, a town with plenty of parks and highly rated schools. If you're working remotely, you won't be alone, as over 10% of the people who live in Saint Paul work from home. When you need a city fix, Dallas is just a 35-minute drive away.

Photo credit:jonmadisonphotography.com/ shutterstock.com

16. NILES, MI

Population: 11,332
Lowest cost for gigabit broadband: $60
Provider: AT&T Fiber
Median home price: $136,400
Median home size: 5.3 rooms
Coffee shops per 100K: 30
Parks per 100K: 34
Non-chain restaurants: 79%
Workers in arts and education: 3.7%
Health care practitioners: 2.2%
Workers at home: 2.7%

On the banks of the St. Joseph River is Niles, also known as the City of Four Flags, as the old fort there was at one time occupied by France, Britain, Spain, and the United States. If you're looking for riverside living with a lot of history, Niles may be the town for you. The city is just nine miles from South Bend, Indiana, and 90 miles from Chicago. Niles has a large number of parks, which are home to festivals in the spring, summer, and fall. Beachcombers will also appreciate nearby Lake Michigan's beaches and state parks.

Photo credit:jSean Pavone/ shutterstock.com

17. TAOS, NM

Population: 5,687
Lowest cost for gigabit broadband: $80
Provider: Xfinity from Comcast
Median home price: $313,700
Median home size: 4.6 rooms
Coffee shops per 100K: 88
Parks per 100K: 18
Non-chain restaurants: 93%
Workers in arts and education: 8.4%
Health care practitioners: 1.7%
Workers at home: 9.4%

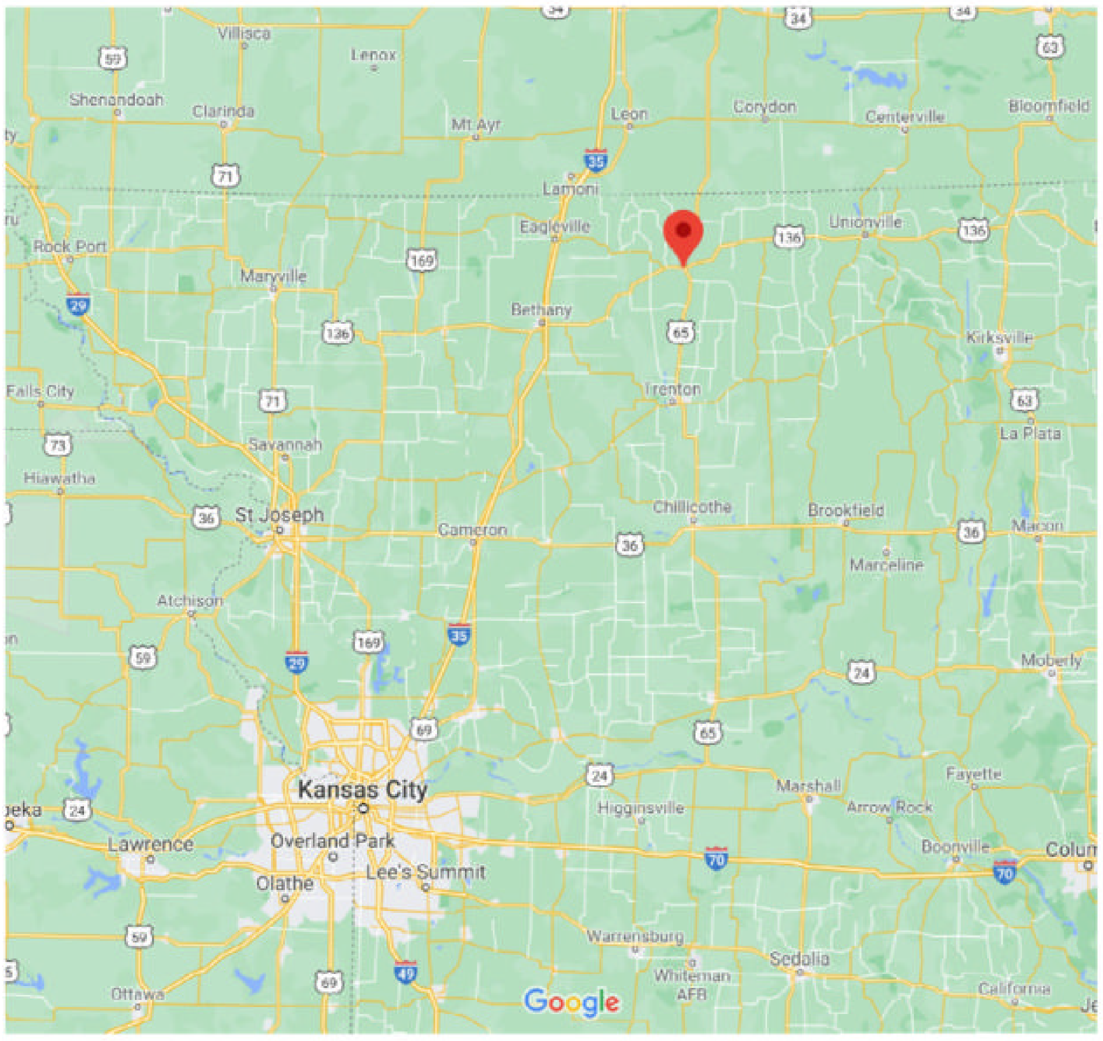
Looking for a diverse town with fine art traditions, great culinary options, and a lively music scene? Taos is a great option. Home to an art colony, Taos also boasts a ski resort and a World Heritage Site, the Taos Pueblo, set against the backdrop of the majestic Rocky Mountains and Rio Grande Gorge. The art community has been thriving for decades; D.H. Lawrence and Georgia O'Keeffe lived and worked there. The city is also just a little over an hour away from Santa Fe, New Mexico.

Photo credit:EA Given/ shutterstock.com

18. REEDSBURG, WI

Population: 9,480
Lowest cost for gigabit broadband: $50
Provider: Reedsburg Utility Commission
Median home price: $179,800
Median home size: 5.7 rooms
Coffee shops per 100K: 35
Parks per 100K: 47
Non-chain restaurants: 84%
Workers in arts and education: 8.2%
Health care practitioners: 3.0%
Workers at home: 1.6%

About an hour north of busy Madison, Wisconsin is the rural city of Reedsburg. Teeming with small-town charm, the community boasts a top-notch school system and an abundance of natural resources along the Baraboo River. A very walkable historic downtown district flanks the river, as well as a thriving tech community. Some good news for remote workers: the city offers the fastest available Internet access in Wisconsin at gigabit speeds for just $50 a month via Reedsburg Utility Commission. The median home price is low at just $179,800, and there are a ton of parks to visit within the city limits.


Villisca
Lenox
Shenandoah
Clarinda
Mt Ayr
Leon
Corydon
Centerville
Bloomfield
Lamoni
Eagleville
Unionville
Rock Port
Maryville
Bethany
Kirksville
Falls City
Trenton
La Plata
Savannah
Hiawatha
St Joseph
Cameron
Chillicothe
Brookfield
Macon
Marceline
Atchison
Moberly
Kansas City
Overland Park
Lawrence
Olathe
Lee's Summit
Higginsville
Marshall
Arrow Rock
Fayette
Boonville
Warrensburg
Sedalia
Whiteman AFB
California
Ottawa
Google

19. PRINCETON, MO

Population: 950
Lowest cost for gigabit broadband: $105
Provider: GRM Networks
Median home price: $51,200
Median home size: 5.4 rooms
Coffee shops per 100K: 27
Parks per 100K: 27
Non-chain restaurants: 86%
Workers in arts and education: 9.7%
Health care practitioners: 0.2%
Workers at home: 6.4%

With the right internet connection, it's possible to work from extremely small-town America. Princeton is a perfect example: a historic little town in Missouri farm country, the birthplace of Calamity Jane, and the Mercer County seat. Princeton is pretty far from anywhere, and not much goes on here; that makes it a perfect place for quiet living in a home without a mortgage on it: Princeton ranks high on our list because of its very low housing and land costs.

Photo credit:pisaphotography/ shutterstock.com

20. DAYTONA BEACH, FL

Population: 65,339
Lowest cost for gigabit broadband: $60
Provider: AT&T Fiber
Median home price: $165,100
Median home size: 4.6 rooms
Coffee shops per 100K: 23
Parks per 100K: 23
Non-chain restaurants: 78%
Workers in arts and education: 6.5%

Health care practitioners: 3.3%
Workers at home: 4.6%

The Daytona Beach area is a popular spring break hotspot, but there's also a great spot for remote workers nearby: The metro area includes Deltona, a bedroom community for Daytona and Orlando. Affordable housing in the form of planned communities for permanent residents is key in Daytona Beach, as the median home price is just $165,100. Along with Orlando, Daytona Beach offer numerous tourist attractions, and neighboring Deltona has plenty of lakes and woods to explore, as well as an abundance of parks and coffee shops and three private schools.

Photo credit:Renee Foskett/ shutterstock.com

21. THE WOODLANDS, TX

Population: 109,608
Lowest cost for gigabit broadband: $60
Provider: AT&T Fiber
Median home price: $363,800
Median home size: 7.3 rooms
Coffee shops per 100K: 19
Parks per 100K: 10
Non-chain restaurants: 73%
Workers in arts and education: 9.5%
Health care practitioners: 5.5%
Workers at home: 9.7%

The suburbs surrounding Houston comprise the fourth-largest metro area in the United States, and that's where you'll find The Woodlands. There are plenty of cultural options, from performing arts to museums, and The Woodlands is known for its many parks, golf courses, and corporate headquarters. Just under 10% of the labor force works from home. The Woodlands also has a fine public school system. And if you want to take a trip into the big city, it's just 28 minutes from Houston.

Photo credit:Wangkun Jia/ shutterstock.com

22. PRICE, UT

Population: 8,337
Lowest cost for gigabit broadband: $55
Provider: Veracity Networks
Median home price: $195,200
Median home size: 5.5 rooms
Coffee shops per 100K: 29
Parks per 100K: 15
Non-chain restaurants: 71%
Workers in arts and education: 8.4%
Health care practitioners: 1.9%
Workers at home: 2.8%

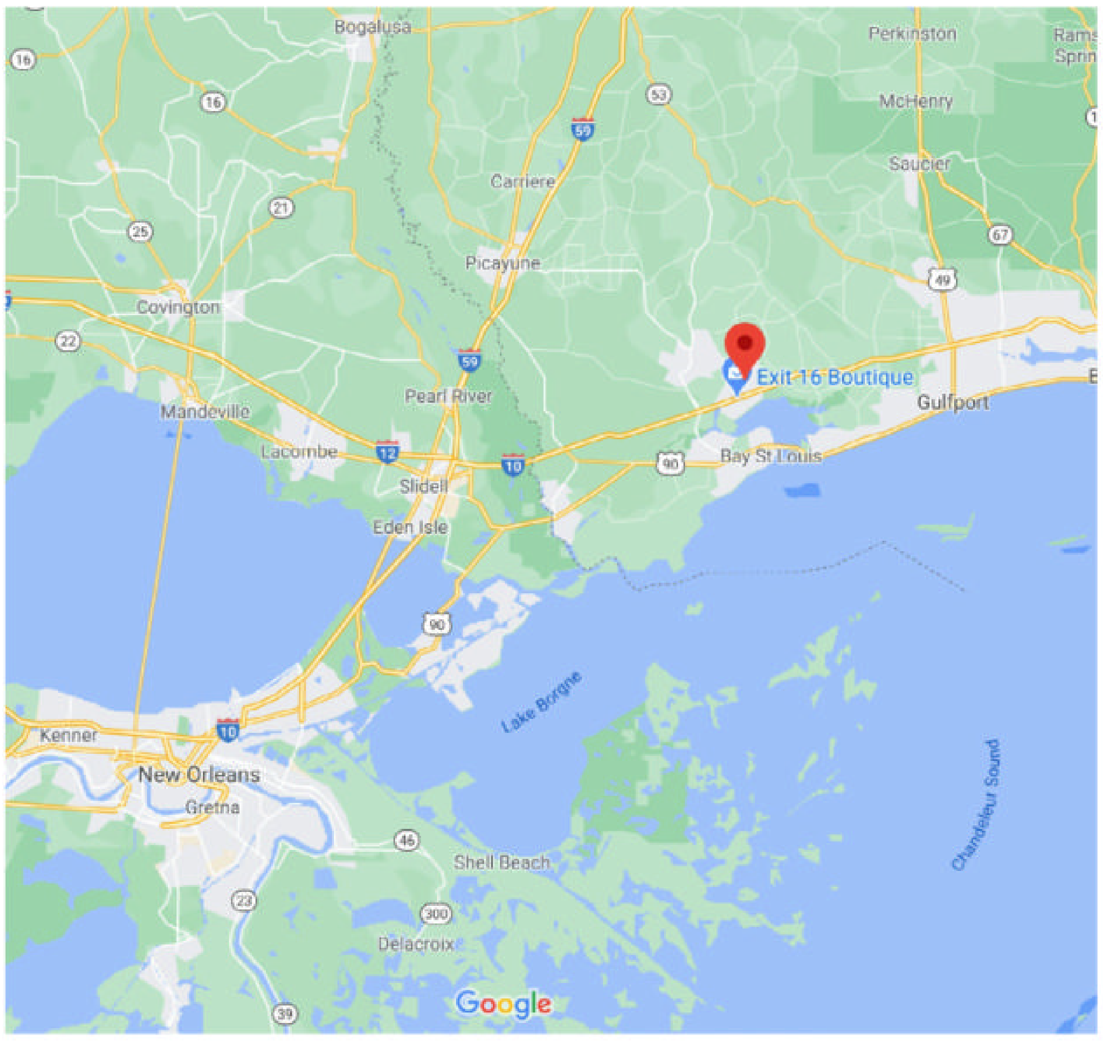
A college town that's home to Utah State University Eastern, Price is also close to dramatic natural beauty, including Nine Mile Canyon, Manti-La Sal National Forest, and the Cleveland-Lloyd Dinosaur Quarry. According to Wikipedia, Price is known for being a small but ethnically diverse community: Greek, Italian, eastern European, Mexican, Japanese, and other ethnic groups make up the population, which is unusual for small towns in Utah.

Photo credit:milehightraveler/ gettyimages

23. RANGELY, CO

Population: 2,169
Lowest cost for gigabit broadband: $70
Provider: Visionary
Median home price: $204,900
Median home size: 5.3 rooms
Coffee shops per 100K: 46
Parks per 100K: 15
Non-chain restaurants: 89%
Workers in arts and education: 13.2%
Health care practitioners: 2.0%
Workers at home: 4.1%

Looking to live in a place where ancient people and beasts roamed? Try Rangely. The rural town is located in the Great West region of Northwest Colorado and is close to Dinosaur National Monument. There are various nearby archeological sites, cave painting sites, museums, and camping and fishing spots for your family to explore. You can check out the Dinosaur Diamond Byway for a scenic driving experience. The median home price is a very affordable $204,900, and remote workers can find gigabit broadband internet for $70 a month.


Bogalusa
Perkinston
McHenry
Saucier
Carriere
Picayune
Covington
Mandeville
Lacombe
Pearl River
Slidell
Eden Isle
Exit 16 Boutique
Gulfport
Bay St Louis
Lake Borgne
Kenner
New Orleans
Gretna
Shell Beach
Delacroix
Chandeleur Sound
Google

24. DIAMONDHEAD, MS

Population: 8,200
Lowest cost for gigabit broadband: $80
Provider: C Spire Fiber
Median home price: $164,100
Median home size: 5.9 rooms
Coffee shops per 100K: 28
Parks per 100K: 2
Non-chain restaurants: 79%
Workers in arts and education: 15.2%
Health care practitioners: 5.8%
Workers at home: 4.3%

Located in the Gulfport-Biloxi-Pascagoula metro area, Diamondhead is a Gulf Coast city about 50 miles northeast of New Orleans and an affordable coastal alternative to Florida. The median home price of $164,100 is a bargain for water-adjacent property. Diamondhead also offers golf courses, marinas, tennis courts, and public parks to enjoy nearby. The winters are very mild, and you can check out local beaches almost year-round.

Photo credit: Judy Rushing / GettyImages

25. MADISON, MS

Population: 25,350
Lowest cost for gigabit broadband: $60
Provider: AT&T Fiber
Median home price: $282,400
Median home size: 7.2 rooms
Coffee shops per 100K: 29
Parks per 100K: 10
Non-chain restaurants: 74%
Workers in arts and education: 11.1%
Health care practitioners: 11.5%
Workers at home: 3.4%

A suburb of Jackson, Mississippi's largest city, Madison is also close to the Ross R. Barnett Reservoir, a popular summer attraction. The city features beautiful old neighborhoods as well as some newer architectural developments near the city of Canton. The University of Mississippi Medical Center is a major source of jobs and a strong healthcare network.

Photo credit: Photo by Mike Kline (notkalvin) / Gettyimages

26. CHARLESTON, WV

Population: 49,384
Lowest cost for gigabit broadband: $80
Provider: Xfinity from Comcast
Median home price: $120,300
Median home size: 5.7 rooms
Coffee shops per 100K: 22
Parks per 100K: 10
Non-chain restaurants: 72%
Workers in arts and education: 9.0%
Health care practitioners: 6.9%
Workers at home: 3.4%

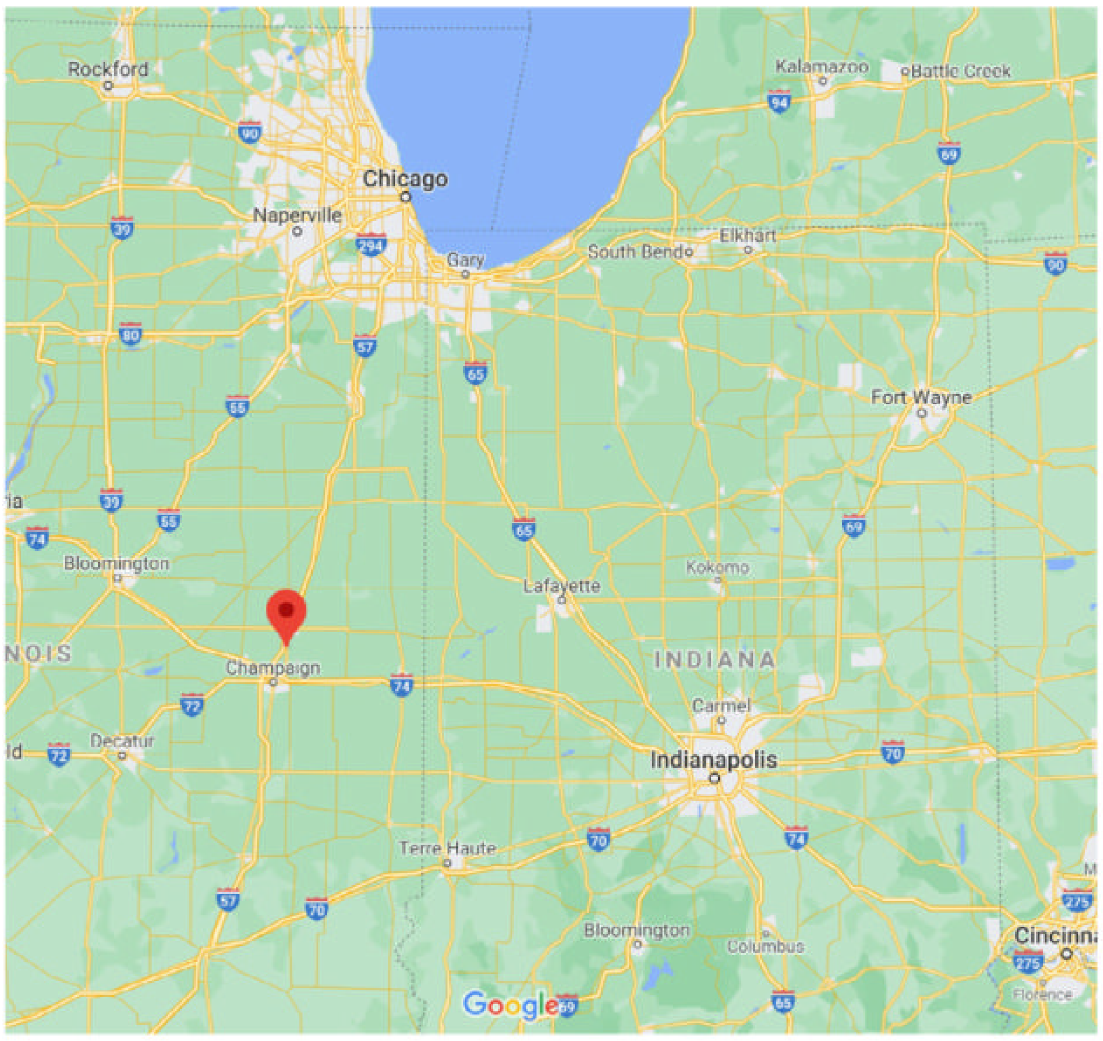
A rare state capital on our list, Charleston is also the commercial center of West Virginia. It offers a performing arts center in the downtown district as well as the Haddad Riverfront Park on the banks of the Kanawha River. The Kanawha State Forest is just seven miles south of Charleston and has a campground, a playground, and a 9,300-acre forest to explore. The median home price is a budget-friendly $120,300.

Photo credit: JDavid Goldman/AP/Shutterstock

27. FAIRBURN, GA

Population: 14,257
Lowest cost for gigabit broadband: $60
Provider: AT&T Fiber
Median home price: $204,500
Median home size: 5.6 rooms
Coffee shops per 100K: 50
Parks per 100K: 21
Non-chain restaurants: 83%
Workers in arts and education: 9.1%
Health care practitioners: 1.9%
Workers at home: 7.0%

Part of the Atlanta metro suburban area, Fairburn is 25 minutes south of the big city and Hartsfield-Jackson Atlanta International Airport, one of the world's busiest travel hubs. Fairburn Main Street was created as part of the state's efforts to encourage investment in the historic downtown district and features shops, restaurants, and other small businesses. Fairburn is also home to the Georgia Renaissance Festival and educational institutions including Brenau University and the Georgia Military Academy. And one of the best things about the Atlanta metro area is the low cost of high-quality real estate.


Rockford
Kalamazoo
Battle Creek
Chicago
Naperville
Gary
South Bend
Elkhart
Fort Wayne
Bloomington
Kokomo
Lafayette
Champaign
INDIANA
Carmel
Decatur
Indianapolis
Terre Haute
Bloomington
Columbus
Florence
Google

28. THOMASBORO, IL

Population: 1,082
Lowest cost for gigabit broadband: $60
Provider: Volo Broadband
Median home price: $86,500
Median home size; 5.6 rooms
Coffee shops per 100K: 32
Parks per 100K: 31
Non-chain restaurants: 74%
Workers in arts and education: 4.5%
Health care practitioners: 0.7%
Workers at home: 2.3%

Thomasboro is part of the Champaign-Urbana metro area, and nearby University of Illinois means bars, restaurants, and sporting events abound. Thomasboro also has a fair number of tech companies and research organizations. It's just about two hours south of Chicago and 16 minutes from Champaign. The area is mostly prairie farmland, but attractions include Sleepy Creek Vineyards and the Staerkel Planetarium. The real treasure of Thomasboro is its real estate prices; the median home price is just $86,500.

Photo credit: JJAIRTELLO/Shutterstock

29. CUMBERLAND, MD

Population: 20,084
Lowest cost for gigabit broadband: $80
Provider: Xfinity from Comcast
Median home price; $91,000
Median home size: 5.6 rooms
Coffee shops per 100K: 17
Parks per 100K: 12

Non-chain restaurants: 77%
Workers in arts and education: 5.2%
Health care practitioners: 4.8%
Workers at home: 2.3%

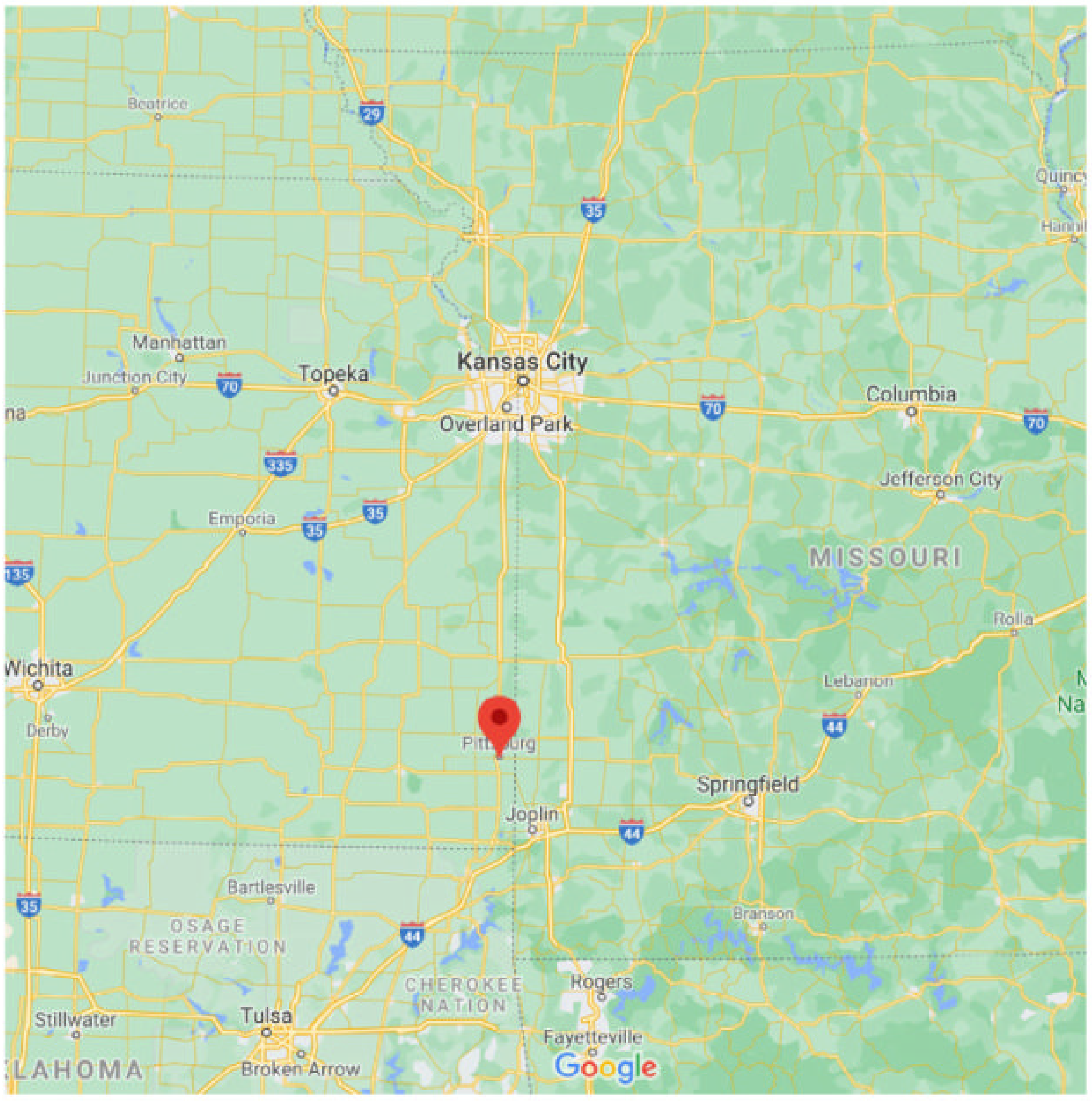
Just a two-hour drive from Pittsburgh, this town on the Potomac River features a thriving arts and entertainment district, the Western Maryland Railway Station, and The Great Allegheny Passage, a popular hiking and biking trail that starts in Pittsburgh and ends in Cumberland. The city is surrounded by beautiful natural landscapes, and it also offers plenty of environmental points of interest within driving distance, including Dan's Mountain State Park and Rocky Gap State Park. Both housing and broadband costs are very low.

30. WEIRTON, WV

Photo credit: Sherman Cahal/Shutterstock

Population: 19,081
Lowest cost for gigabit broadband: $80
Provider: Xfinity from Comcast
Median home price: $91,500
Median home size: 5.7 rooms
Coffee shops per 100K: 100
Parks per 100K: 7
Non-chain restaurants: 85%
Workers in arts and education: 4.5%
Health care practitioners: 5.5%
Workers at home: 3.1%

Thirty miles west of Pittsburgh is the city of Weirton, West Virginia, a small steel town that borders the city of Steubenville, Ohio, across the Ohio River. According to BestPlaces, a Walmart distribution facility came to the region and boosted the local economy—but the cost of living in Weirton is 25.1% lower than the US average, and the median home price is just $91,500. There are plenty of coffee shops to work in or just enjoy in this community.


Beatrice
Manhattan
Junction City
Topeka
Kansas City
Overland Park
Columbia
Jefferson City
Emporia
MISSOURI
Rolla
Wichita
Derby
Lebanon
Pittsburg
Springfield
Joplin
Bartlesville
OSAGE RESERVATION
Branson
CHEROKEE NATION
Rogers
Stillwater
Tulsa
Fayetteville
Broken Arrow
LAHOMA
Google

31. PITTSBURG, KS

Population: 20,278
Lowest cost for gigabit broadband: $70
Provider: Craw-Kan Telephone Cooperative
Median home price: $85,400
Median home size: 5.1 rooms
Coffee shops per 100K: 28
Parks per 100K: 23
Non-chain restaurants: 74%
Workers in arts and education: 11.8%
Health care practitioners: 3.3%
Workers at home: 2.5%

Named after the bigger city in Pennsylvania (which seems to be a remote-work nerve center), Pittsburg is nestled in the Ozark Highlands region of Kansas. A little over 2 hours from Kansas City, Missouri, it's home to Pittsburg State University. The local government offers attractive incentives for new and existing businesses, among them low-cost or free land and bureaucratic fast-tracking, making it a hot spot for entrepreneurs. Pittsburg is also home to numerous festivals, including the Little Balkans Days Celebration; many are hosted at one of the city's 23 parks. The cost of living is 31.2% lower than the U.S. national average.

Photo credit: pisaphotography/Shutterstock

32. NATCHEZ, MS

Population: 15,191
Lowest cost for gigabit broadband: $60
Provider: AT&T Fiber
Median home price: $92,300
Median home size: 5.3 rooms
Coffee shops per 100K: 16
Parks per 100K: 19
Non-chain restaurants: 79%
Workers in arts and education: 9.0%
Health care practitioners: 4.9%
Workers at home: 1.5%

Natchez's city slogan is "Y'all means all"—meaning it embraces diversity in perspectives, lifestyles, and cultures. It's also the first settlement on the Mississippi River, just beating out New Orleans. Places to see in Natchez include a variety of antebellum mansions and Native American heritage sites. The city was once infamous for the gambling at Natchez Under-the-Hill, and today, you can still play the slots at the Magnolia Bluffs Casino. And Natchez encourages entrepreneurship by offering numerous marketing incentives for businesses. Located about 90 minutes away from Baton Rouge, Louisiana, Natchez is an affordable place to live on the Mississippi River, with its median home price of $92,300.

Photo credit: Andy Wilcock/Shutterstock

33. OSWEGO, IL

Population: 33,759
Lowest cost for gigabit broadband: $60
Provider: AT&T Fiber
Median home price: $263,900
Median home size: 7.6 rooms
Coffee shops per 100K: 15
Parks per 100K: 20
Non-chain restaurants: 68%
Workers in arts and education: 11.1%
Health care practitioners: 5.9%
Workers at home: 4.8%

Oswego is a suburban village in Illinois, about an hour southwest of Chicago, where you'll find lots of parks to explore and a thriving downtown district with small businesses and restaurants. Outdoorsy types can ride bikes along the Fox River Trail, which offers over 40 miles of riverfront views. Though the cost of living is a little above the US average, housing costs remain low.

Photo credit: Sean Pavone/Shutterstock

34. MACON, GA

Population: 153,621
Lowest cost for gigabit broadband: $60
Provider: AT&T Fiber
Median home price: $94,000
Median home size: 5.4 rooms
Coffee shops per 100K: 22
Parks per 100K: 8
Non-chain restaurants: 66%
Workers in arts and education: 8.2%
Health care practitioners: 4.9%
Workers at home: 2.8%

Macon is first and foremost a college town, home to Wesleyan College, Mercer University, Middle Georgia State University, and Central Georgia Technical College. The Georgia Music Hall of Fame is located within the city, reflecting its rich cultural and art heritage. Music greats such as Otis Redding and Little Richard once called Macon home, and the city has beautiful architecture along its tree-lined streets. Macon's home prices are far lower than Atlanta to the north, with the median home price at $94,000.

Photo credit: Inspired By Maps/Shutterstock

35. STOCK ISLAND, FL

Population: 4,201
Lowest cost for gigabit broadband: $60
Provider: AT&T Fiber
Median home price: $423,200
Median home size: 3.8 rooms
Coffee shops per 100K: 103
Parks per 100K: 43
Non-chain restaurants: 92%
Workers in arts and education: 4.3%
Health care practitioners: 1.2%
Workers at home: 0%

If you want the Key West lifestyle on a budget, look no further than Stock Island, Florida. With the Cow Key Channel separating it from Key West, Stock Island is a tranquil and diverse city that's home to many workers who immigrated from Haiti and Cuba. Unlike Key West, most of the people living in

Stock Island are year-round residents, and many of them are part of the active artist community that operates local shops and studios.

Photo credit: IKhairil Azhar Junos/Shutterstock

36. MILLSBORO, DE

Population: 4,181
Lowest cost for gigabit broadband: $80
Provider: Xfinity from Comcast
Median home price: $262,200
Median home size: 5.4 rooms
Coffee shops per 100K: 26
Parks per 100K: 14
Non-chain restaurants: 87%
Workers in arts and education: 10.2%
Health care practitioners: 2.9%
Workers at home: 6.9%

A small town in fast-growing Sussex County, Millsboro welcomes families and professionals with no sales tax, low property taxes, and a solid school district. The town of just over 4,000 people is within driving distance of Washington D.C., Philadelphia, Baltimore, and Norfolk, Virginia, while the coastal beach communities of Lewes, Rehoboth Beach, Dewey Beach, Bethany Beach, and Ocean City are less than 20 miles away.

Photo credit:Sean Pavone/Shutterstock

37. PHOENIX, AZ

Population: 1,574,421
Lowest cost for gigabit broadband: $65
Provider: CenturyLink
Median home price: $283,200
Median home size: 5.1 rooms
Coffee shops per 100K: 27
Parks per 100K: 13
Non-chain restaurants: 73%
Workers in arts and education: 6.3%
Health care practitioners: 3.5%
Workers at home: 5.7%

Phoenix is a growing city with reasonable but rapidly rising home prices. You may want to check out Phoenix's large, middle-class suburbs of Peoria, Mesa, Chandler, and Glendale for housing deals, and the college town of Tempe is a good option as well. Phoenix winters are warm and pleasant, and there's plenty to do in a city with over 1.5 million people. The economy has been driven by tech companies, particularly in the software and defense sectors, that have relocated from California.

Photo credit:Loren M Rye/gettyimages

38. HICKMAN, NE

Population: 2,079
Lowest cost for gigabit broadband: $75
Provider: Windstream
Median home price: $269,900
Median home size: 6.7 rooms
Coffee shops per 100K: 30
Parks per 100K: 22
Non-chain restaurants: 76%
Workers in arts and education: 11.5%
Health care practitioners: 7.1%
Workers at home: 6.9%

Hickman is a small, rural midwestern town 16 miles from the Lincoln Metro Area in Nebraska and the University of Nebraska, which offers college-town bars and football in the fall. Almost 12% of the population is employed in the arts and education fields, and nearly 7% work from home.

Photo credit:Wileydoc/shutterstock.com

39. MORRISVILLE, NC

Population: 23,873
Lowest cost for gigabit broadband: $60
Provider: AT&T Fiber
Median home price: $327,900
Median home size: 5.3 rooms
Coffee shops per 100K: 29
Parks per 100K: 15
Non-chain restaurants: 76%
Workers in arts and education: 6.2%
Health care practitioners: 4.1%
Workers at home: 9.0%

A tech haven, Morrisville is part of the Research Triangle metro region, which includes Duke University in Durham, The University of North Carolina in Chapel Hill, and North Carolina State University in Raleigh. It has a strong economic base that's bolstered by companies such as Lenovo, Oracle, and Syneos Health. Morrisville's public school system is solid, and the city is known for family friendliness, diversity, and well-educated residents. It's far enough inland that coastal storms aren't much of a problem, and the weather is pretty pleasant year-round.

Photo credit:Patrick baehl de Lescure/shutterstock.com

40. MONTOUR FALLS, NY

Population: 2,821
Lowest cost for gigabit broadband: $65
Provider: Empire Access
Median home price: $137,300
Median home size: 5.1 rooms
Coffee shops per 100K: 50
Parks per 100K: 22
Non-chain restaurants: 90%
Workers in arts and education: 5.8%
Health care practitioners: 4.4%
Workers at home: 2.9%

Montour Falls is one of several attractive towns in the Finger Lakes region served by Empire Access, which we named one of the best gaming ISPs in the US. The tiny village, just 3 square miles, is surrounded by hills and is home to several beautiful waterfalls. Nearby Corning and Elmira also landed further down on our list. The Finger Lakes region is New York's largest wine-producing area, and the craft beer industry is also thriving there.

Photo credit:traveler jordan/shutterstock.com

41. HALEYVILLE, AL

Population: 3,999
Lowest cost for gigabit broadband: $80
Provider: Tombigbee Electric Cooperative
Median home price: $69,300
Median home size: 5.1 rooms
Coffee shops per 100K: 13
Parks per 100K: 13

Non-chain restaurants: 71%
Workers in arts and education: 3.2%
Health care practitioners: 3.9%
Workers at home: 3.8%

Located a little over an hour north of Birmingham and nestled in the foothills of the Smoky Mountains, Haleyville has a small-town feel. Just under 4% of its residents work from home, so remote workers are something of an anomaly, but the low cost of living is worth it. For those craving a lively music scene, the city is less than an hour from Muscle Shoals on the Tennessee River, which is known for its music community. The median home price is extraordinarily low at $69,300.

Photo credit:G. A. Mac/shutterstock.com

42. RANDALLSTOWN, MD

Population: 35,438
Lowest cost for gigabit broadband: $80
Provider: Verizon Fios
Median home price: $262,300
Median home size: 6.8 rooms
Coffee shops per 100K: 16
Parks per 100K: 12
Non-chain restaurants: 77%
Workers in arts and education: 6.8%
Health care practitioners: 5.1%
Workers at home: 4.5%

An upscale, mostly African-American suburb of Baltimore, Randallstown offers low-key suburban living a short drive or subway ride from the city's big-name attractions. Randallstown rated well for having spacious houses at relatively low prices near Baltimore and Washington, and the Verizon Fios internet is speedy and reliable. This might be a good pick for people working at home for government-related employers.

Photo credit: Hank Shiffman/shutterstock.com

43. TERRE HAUTE, IN

Population: 60,691
Lowest cost for gigabit broadband: $67
Provider: Smithville Communications
Median home price: $100,100
Median home size: 5.1 rooms
Coffee shops per 100K: 28
Parks per 100K: 12
Non-chain restaurants: 66%
Workers in arts and education: 9.5%
Health care practitioners: 3.4%
Workers at home: 3.7%

Home to Indiana State University, Terre Haute is a college town 77 miles from Indianapolis. As a midwestern manufacturing city, much of its local economy relies on the businesses located in the Vigo County Industrial Park. For nature lovers, Terre Haute is close to the Wabashiki Fish and Wildlife Area.

Photo credit: Henryk Sadura/shutterstock.com

44. TAYLORVILLE, IL

Population: 11,027
Lowest cost for gigabit broadband: $70
Provider: CTI Fiber
Median home price: $90,600
Median home size: 5.1 rooms
Coffee shops per 100K: 18
Parks per 100K: 21
Non-chain restaurants: 73%
Workers in arts and education: 6.0%
Health care practitioners: 3.0%
Workers at home: 4.1%

Tree-lined streets in orderly neighborhoods welcome you to Taylorville, a suburb of Springfield, Illinois. You'll have access to plenty of outdoor fun. The city is close to golf courses and several lakes, and biking enthusiasts can check out the 15-mile Lincoln Prairie Trail, which starts at the city of Pana and continues into Taylorville. There are several parks for you and your family to enjoy, and small businesses make up the downtown area.

Photo credit: Rainy Roams/shutterstock.com

45. BARTLESVILLE, OK

Population: 36,398
Lowest cost for gigabit broadband: $60
Provider: AT&T Fiber
Median home price: $109,800
Median home size: 5.8 rooms
Coffee shops per 100K: 15
Parks per 100K: 13
Non-chain restaurants: 74%
Workers in arts and education: 7.1%
Health care practitioners: 2.3%
Workers at home: 2.8%

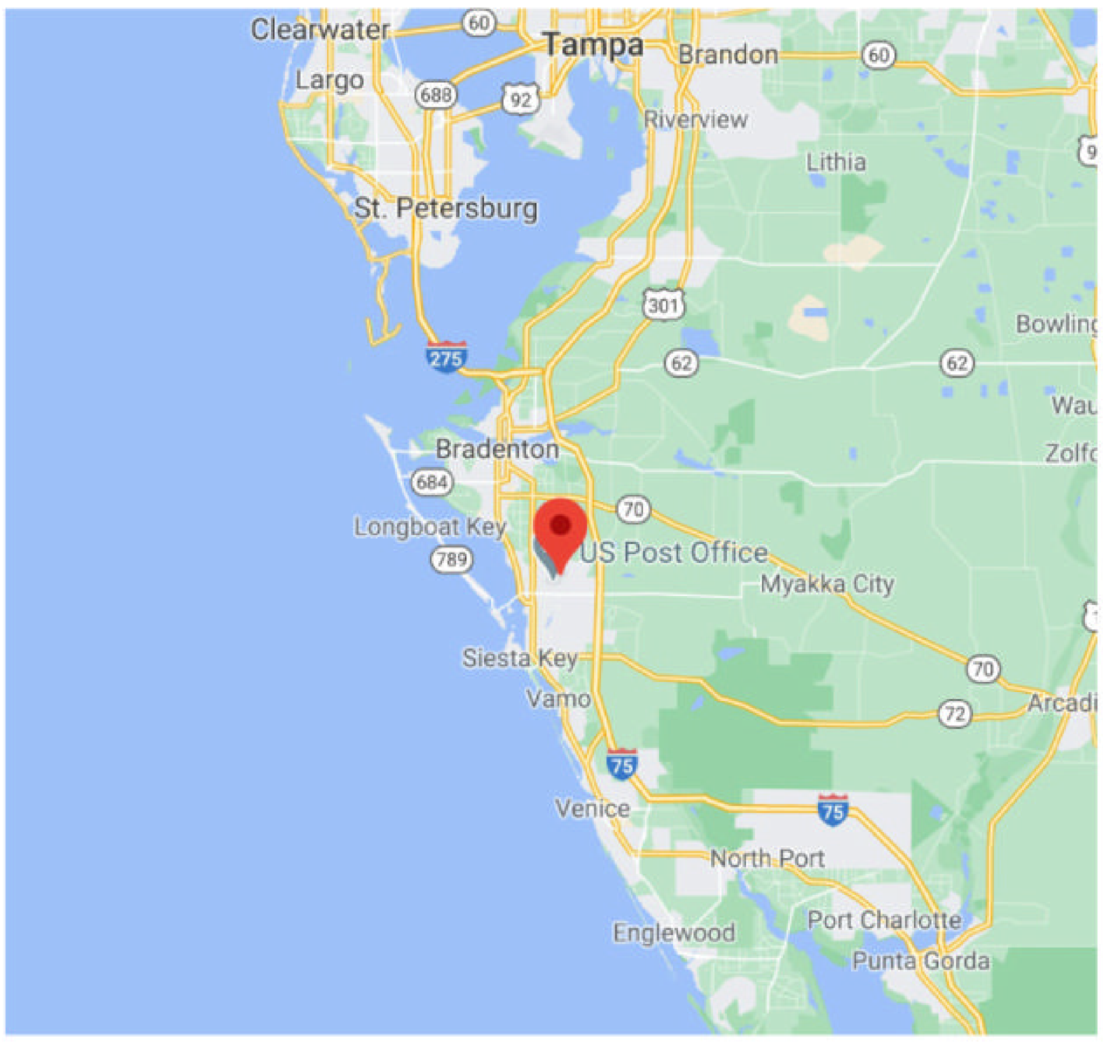
Located in Northeast Oklahoma, Bartlesville is 50 miles from Tulsa. The city has a lot of character: It's the home of the famed Price Tower, the only skyscraper designed by Frank Lloyd Wright. If you have a gambler's spirit, check out the Ramona-Cherokee Casino, in nearby Ramona. About 36,000 people call Bartlesville home, along with major businesses including ConocoPhillips and Phillips 66.

Photo credit: DavidByronKeener/shutterstock.com

46. SHALLOTTE, NC

Population: 3,825
Lowest cost for gigabit broadband: $86
Provider: ATMC
Median home price: $204,300
Median home size: 4.9 rooms
Coffee shops per 100K: 25
Parks per 100K: 20
Non-chain restaurants: 84%
Workers in arts and education: 8.3%
Health care practitioners: 5.8%
Workers at home: 4.2%

Beaches abound near Shallotte, North Carolina: The town is just 10 minutes from Holden Beach, Ocean Isle Beach, and Sunset Beach. It's something of a business hub for Brunswick County as well; over 610 companies call it home. The beautiful Shallotte River passes through the town, and residents tend to gather at Mulberry Park for summer concerts and movies. If you love to travel, the town is just 45 miles from the Myrtle Beach International Airport and 37 miles from the Wilmington International Airport. The median home price is a reasonable $204,300, and the lowest price for gigabit broadband is $86 a month from ATMC.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Largo
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Lithia
St. Petersburg
Bowling
Wau
Zolfo
Bradenton
Longboat Key
US Post Office
Myakka City
Siesta Key
Vamo
Arcadi
Venice
North Port
Englewood
Port Charlotte
Punta Gorda
60
688
92
301
62
275
684
70
789
72
75

47. KENSINGTON PARK, FL

Population: 4,351
Lowest cost for gigabit broadband: $80
Provider: Xfinity from Comcast
Median home price: $174,900
Median home size: 5.2 rooms
Coffee shops per 100K: 39
Parks per 100K: 15
Non-chain restaurants: 84%
Workers in arts and education: 6.8%
Health care practitioners: 0.6%
Workers at home: 4.6%

Kensington Park, with a population of just over 4,300, is a somewhat rural area that's close to the sunny beaches of Sarasota, Florida. Sarasota is home to lots of arts and cultural institutes as well, including the Ringling Museum of Art, the Marie Selby Botanical Gardens, and Ca'd'Zan, the opulent former home of John Ringling and his wife Mable.

Photo credit: Star Tribune via Getty Images / Contributor

48. BROOKLYN PARK, MN

Population: 79,462
Lowest cost for gigabit broadband: $65
Provider: CenturyLink
Median home price: $241,600
Median home size: 6.4 rooms
Workers in arts and education: 5.2%
Health care practitioners: 1.4%
Workers at home: 3.9%

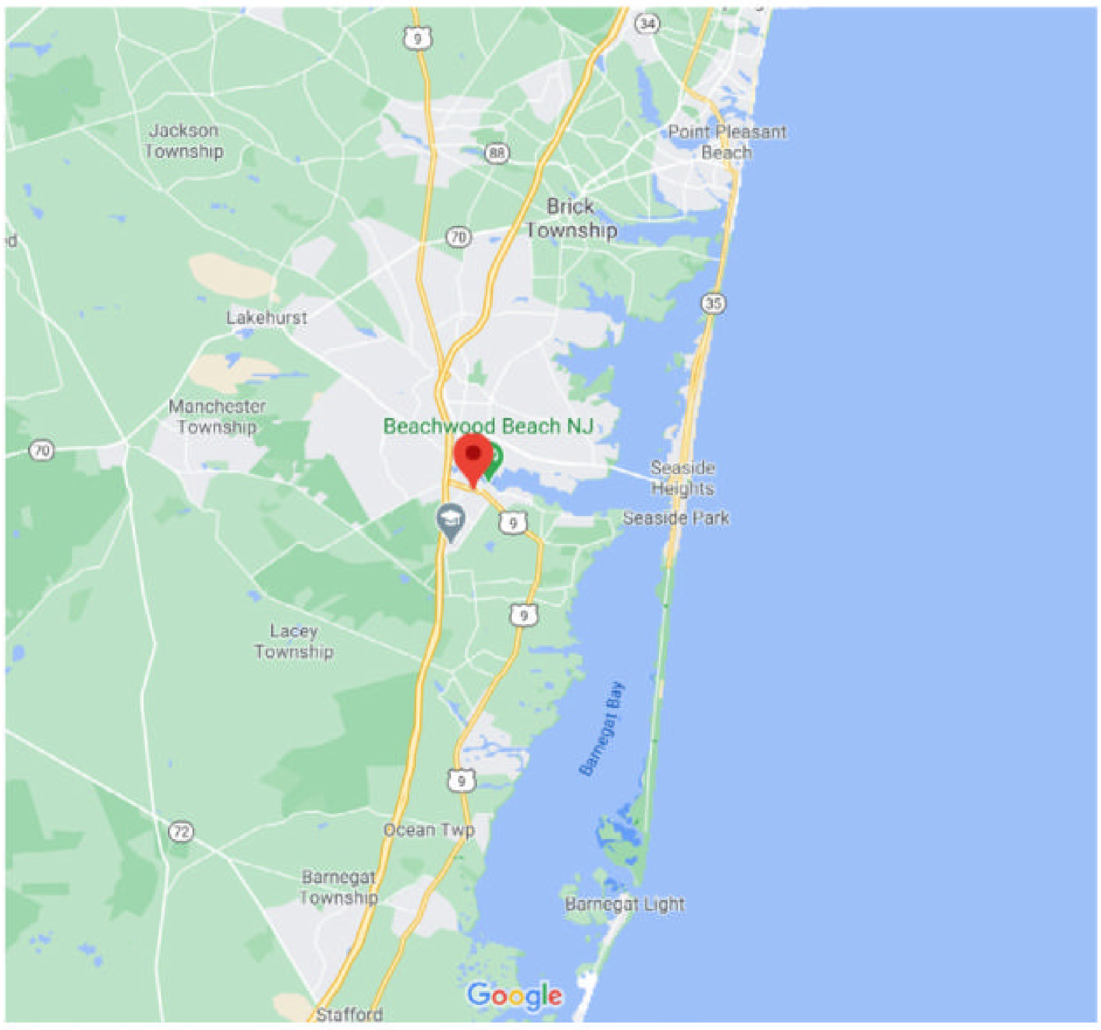
Known as "Tree City USA," Brooklyn Park is home to 47 miles of trails and 67 parks. It's 15 minutes from the Minneapolis–St. Paul–Bloomington metro area, which has a lot to offer remote workers, with its many industrial and educational centers. Companies calling the area home include General Mills, 3M, US Bancorp, and United Healthcare. Area schools have a great reputation, and you'll have an array of major- and minor-league sports teams to follow.

Photo credit: SEASTOCK via Getty Images

49. ARLINGTON, WA

Population: 18,884
Lowest cost for gigabit broadband: $80
Provider: AT&T Fiber
Median home price: $439,900
Median home size: 5.5 rooms
Coffee shops per 100K: 62
Parks per 100K: 18
Non-chain restaurants: 80%
Workers in arts and education: 7.5%
Health care practitioners: 2.5%
Workers at home: 4.7%

Part of Seattle's metro area, this city with a small-town atmosphere rests on the Stillaguamish River. Top-quality schools, a lively downtown area, and plenty of outdoor activities in the Cascades and at Puget Sound are available in Arlington. It costs a little more to live here than other places on our list, as the median home price is $439,900. The lowest cost for gigabit broadband internet is $80 a month from AT&T Fiber.

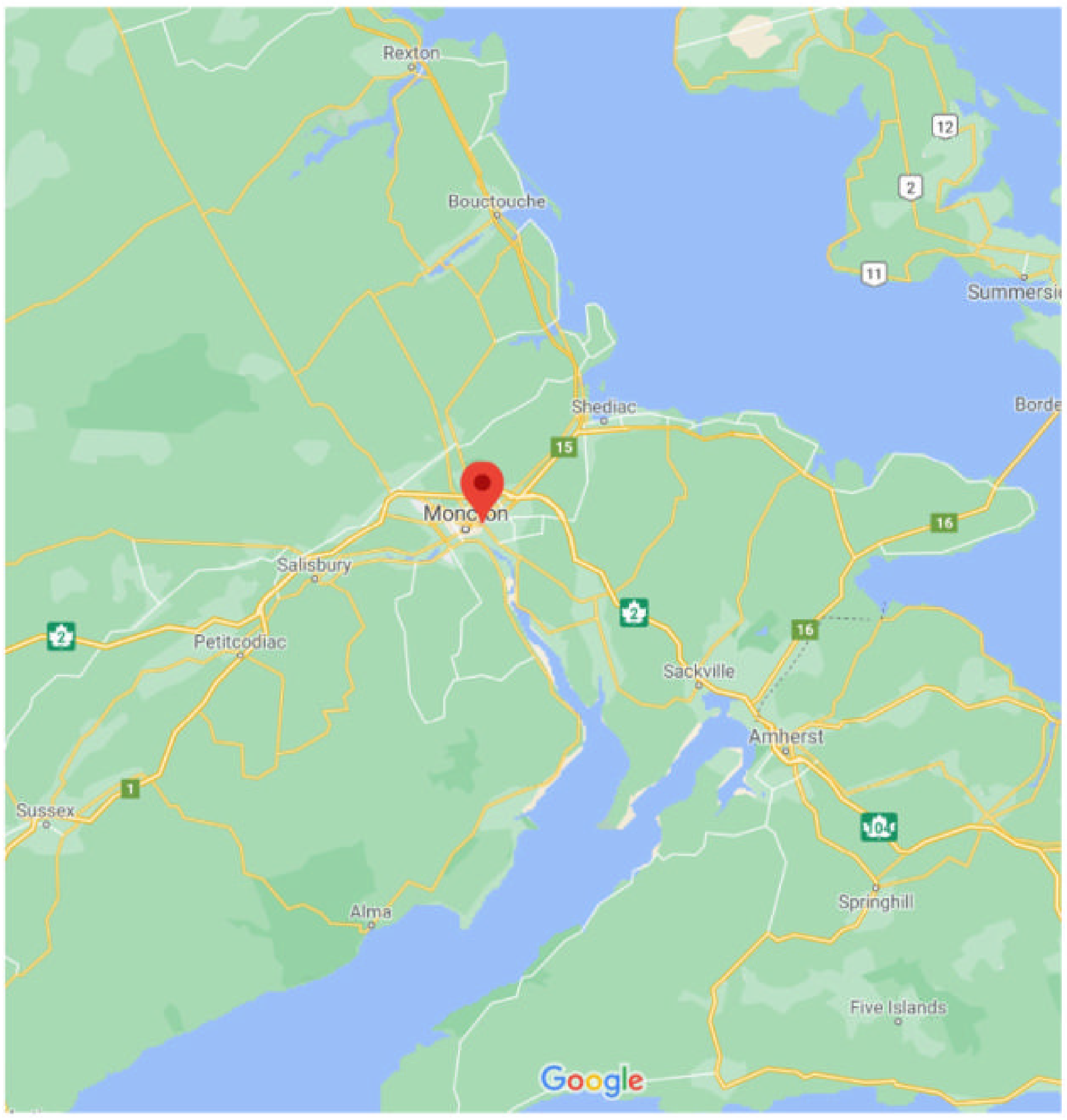

Jackson Township
Point Pleasant Beach
Brick Township
Lakehurst
Manchester Township
Beachwood Beach NJ
Seaside Heights
Seaside Park
Lacey Township
Barnegat Bay
Ocean Twp
Barnegat Township
Barnegat Light
Stafford
Google

50. BEACHWOOD, NJ

Population: 11,193
Lowest cost for gigabit broadband: $80
Provider: Xfinity from Comcast
Median home price: $248,800
Median home size: 6.2 rooms
Coffee shops per 100K: 16
Parks per 100K: 8
Non-chain restaurants: 89%
Workers in arts and education: 10.0%
Health care practitioners: 2.8%
Workers at home: 2.8%

In Ocean County, New Jersey, Beachwood is a small riverfront community that is home to a little over 11,000 people. New York City is an hour or so away, making Beachwood a great place for remote workers to get away from the stress of the big city—though not too far away—and settle somewhere that's safer and more affordable.

CANADA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Summersi
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Borde
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16
Moncton
Salisbury
2
Petitcodiac
2
16
Sackville
Amherst
Sussex
1
104
Springhill
Alma
Five Islands
Google

1. DIEPPE, NB

Population: 27,300
Lowest cost for gigabit broadband: $112.95
Median income: $39,582
Average rooms per dwelling: 6.6
Affordable housing: 83%
Households with postsecondary certificate: 64%
Employed in arts and culture: 2.6%
Independent coffee shops in town: 7
Access to major city: Dieppe is part of Greater Moncton

Our first Canadian entry is Dieppe, one of the largest French-speaking cities outside Quebec. Dieppe is part of the (English-speaking) Moncton metro area and offers numerous parks and green spaces, along with over 55 kilometers of trails perfect for hikers and bikers. Other highlights include downtown restaurants, a public square, a cultural center, a farmers market, and the Dieppe Boulevard sector, a growing business and residential area.

Photo credit: Russ Heinl/Shutterstock.com

2. HALIFAX, NS

Population: 403,131
Lowest cost for gigabit broadband: $99.95
Median income: $36,098
Average rooms per dwelling: 6.4
Affordable housing: 75%
Households with postsecondary certificate: 60%
Employed in arts and culture: 1.9%
Access to major city: Halifax is a major city

Halifax is a major economic center for the Atlantic side of Canada, and it's home to many government services and private companies. That said, the outlying suburban areas of Halifax in Nova Scotia, specifically Hackett's Cove and Hubley, are what caught our eye. Homes are especially affordable in Hackett's Cove, where 87% of residents pay less than 30% of their income for housing. The houses are big, too, with an average of 7.9 rooms. Hackett's Cove features natural attractions such as Fox Point Beach and Bayswater Beach Provincial Park. Hubley is another place to check out: It also features affordable real estate and hiking trails, and it's just 15 kilometers from Halifax.

Photo credit: Stephen Barnes/Getty Images

3. LOGY BAY-MIDDLE COVE-OUTER COVE, NL

Population: 2,285
Lowest cost for gigabit broadband: $112.95
Median income: $47.904
Average rooms per dwelling: 8.4
Affordable housing: 89%
Households with postsecondary certificate: 66%
Employed in arts and culture: 3.3%
Access to major city: 10km from St John's

Is your true love the sea? This northern suburb of St. John's is pure maritime living: rugged, winding roads leading to beautiful beaches on the cold, brave Atlantic. It's still only 10 minutes from St. John's, though, so it's easy to dip into city living, and as the home of Memorial University's Ocean Science Centre, there's an intellectual component to the town as well. There's not much to do in Logy Bay itself other than watch the crashing of the waves, but you can do so from a huge house with gigabit broadband. Statcan says the average home is huge, at 8.4 rooms.

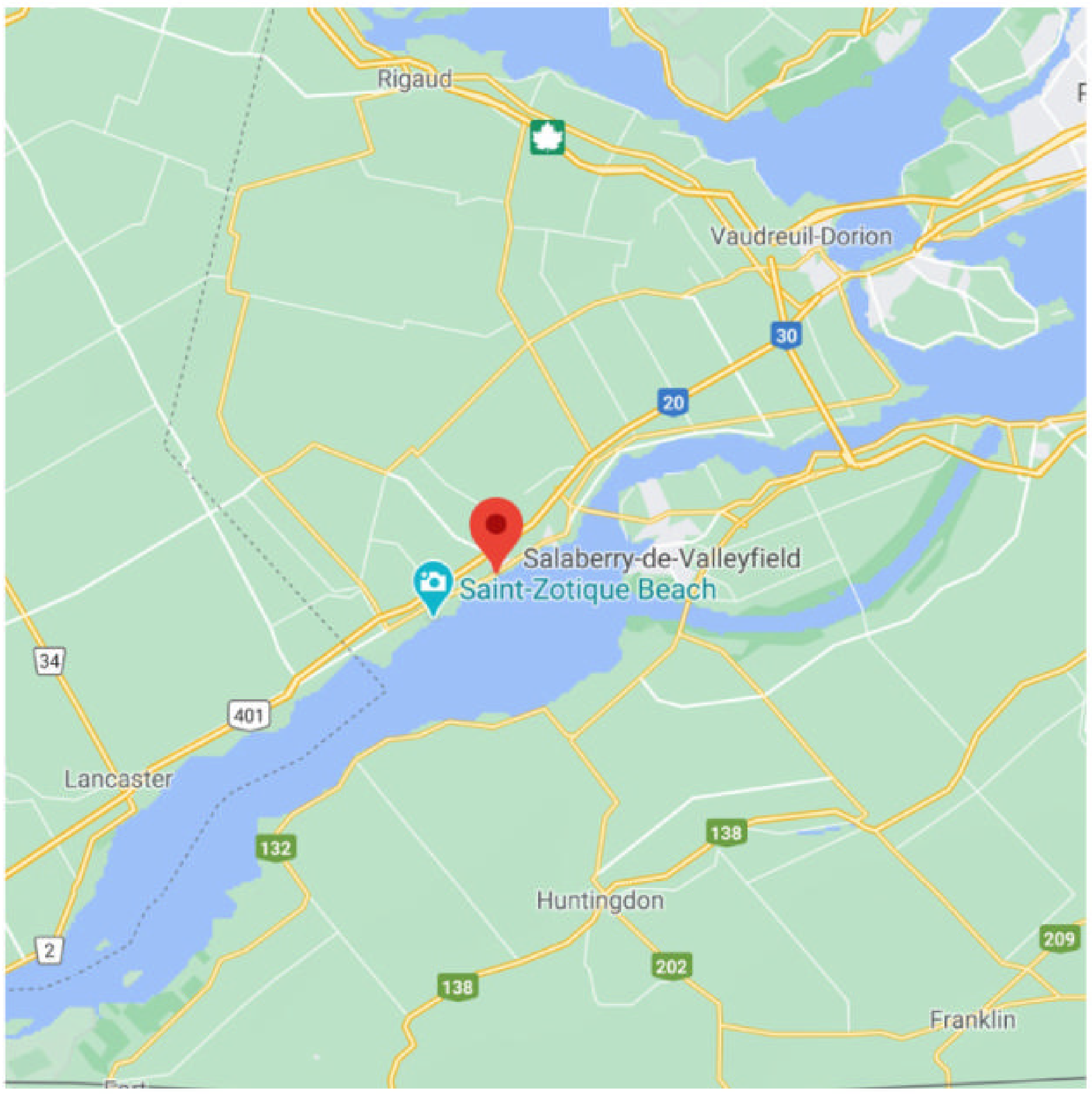
Town of
Quispamsis

Photo credit: dolfin/Shutterstock.com

4. QUISPAMSIS, NB

Population: 18,250
Lowest cost for gigabit broadband: $112.95
Median income: $43,686
Average rooms per dwelling: 7.8
Affordable housing: 89%
Households with postsecondary certificate: 62
Employed in arts and culture: 2.4%
Independent coffee shops in town: 2
Access to major city: 21km from Saint John

Named the "best place to live in Atlantic Canada" by MoneySense, Quispamsis offers plenty of parks, good schools, and small businesses. It's a prominent suburb of Saint John, which offers a plethora of historical and cultural sites. Quispamsis is particularly attractive to older residents, for whom it hosts a number of community programs and wellness initiatives. And housing is very affordable: 89% of residents pay less than 30% of their income for their homes.


Rigaud
Vaudreuil-Dorion
30
20
Salaberry-de-Valleyfield
Saint-Zotique Beach
34
401
Lancaster
132
138
Huntingdon
2
138
202
209
Franklin

5. SAINT-ZOTIQUE, QC

Population: 7,934
Lowest cost for gigabit broadband: $79.95
Median income: $38,661
Average rooms per dwelling: 6.3
Affordable housing: 84%
Households with postsecondary certificate: 52%
Employed in arts and culture: 2%
Independent coffee shops in town: 2
Access to major city: 66km from Montreal

Enjoy summer vacation all year long in Saint-Zotique, a resort town about an hour west of Montreal. During the summer, Saint-Zotique buzzes with activity; during the winter, you may have the beach to yourself as the resorts empty out.

While Saint-Zotique is a French-speaking town, it’s only a 20-minute drive east or west to more thoroughly bilingual locales. And real estate is surprisingly inexpensive for a tourist spot—84% of residents pay less than 30% of their income for their homes.

Photo credit: Brian Kennedy/Getty Images

6. AYR, ON

Population: 4,171
Lowest cost for gigabit broadband: $84.99
Median income: $46,165
Average rooms per dwelling: 7.8
Affordable housing: 90%
Households with postsecondary certificate: 58%
Employed in arts and culture: 2.4%
Independent coffee shops in town: 1
Access to major city: 21km from Kitchener

Twenty-one kilometers south of Kitchener is the community of Ayr, in Ontario’s Waterloo region. The bedroom community has become a hotspot for entrepreneurs, who have brought culinary schools and brewpubs. The picturesque downtown area is sought out by Hollywood filmmakers who shoot anything from movie scenes to television shows in front of the historic houses that line the streets. You can get a lot of real estate for your money here, as 90% of the people who live in Ayr pay less than 30% of their income for their homes, and the houses average 7.8 rooms per dwelling.

Photo credit: AnjelikaGr/Shutterstock.com

7. KING, ON

Population: 24,512
Lowest cost for gigabit broadband: $84.99
Median income: $43,274
Average rooms per dwelling: 8
Affordable housings: 74%
Households with postsecondary certificate: 58%
Employed in arts and culture: 2.5%

Independent coffee shops in town: 5
Access to major city: 50km from Toronto

If you're looking to live within driving distance of Toronto but crave lower housing prices and a small-town feel, two smaller population centers may be attractive to you: King City and Schomberg. King City is the biggest community in King Township, and Schomberg is a small village of just under 2,700 people. Both areas have been discovered by Hollywood; many television shows and movies are shot there thanks to the charming ambiance they offer.

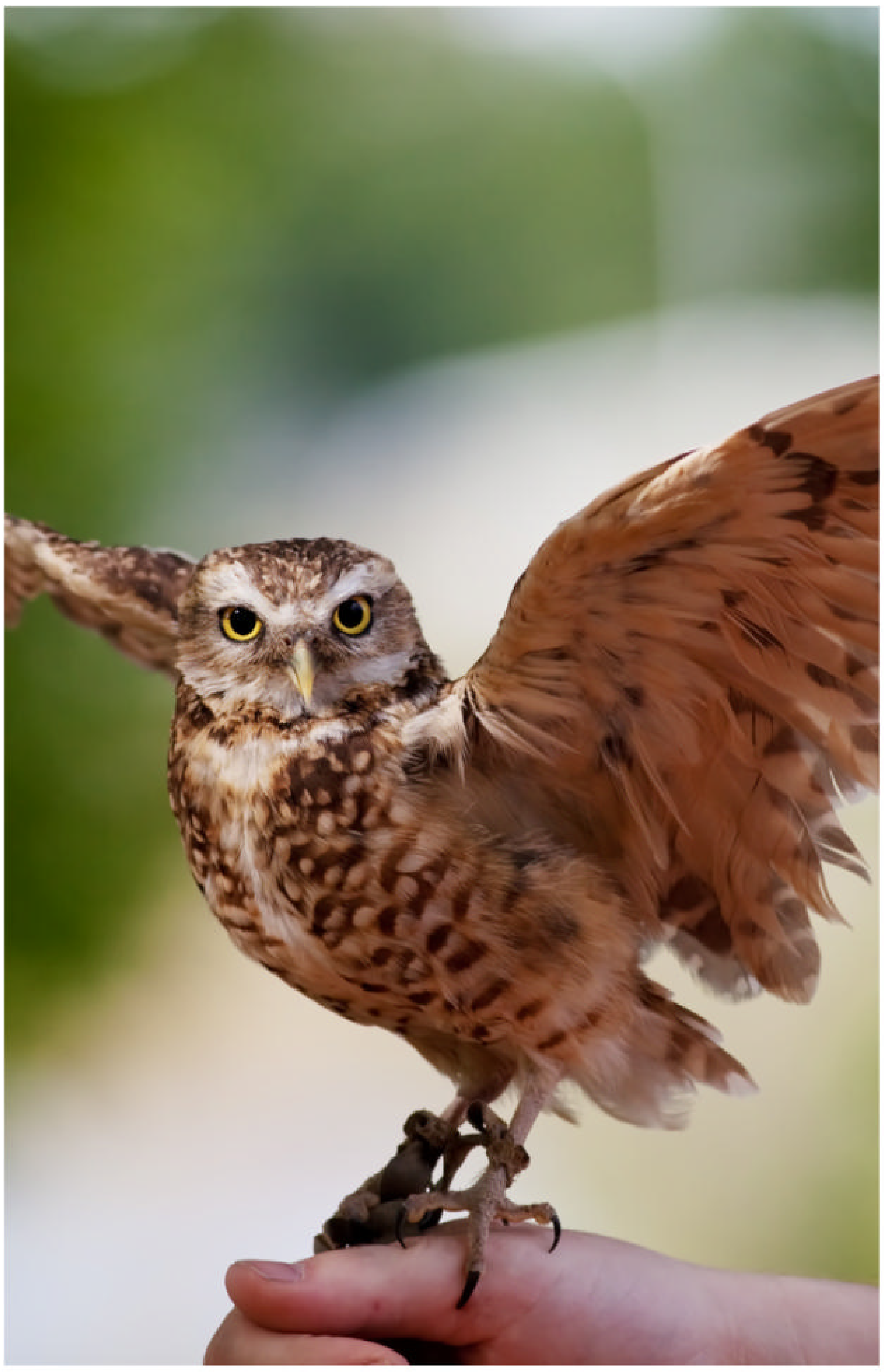


Photo credit: Brenda Carson/Shutterstock.com

8. COALDALE, AB

Population: 8,215
Lowest cost for gigabit broadband: $99
Median income: $39,226
Average rooms per dwelling: 7.4
Affordable housing: 84%
Households with postsecondary certificate: 48%
Employed in arts and culture: 1.5%
Independent coffee shops in town: 1
Access to major city: 17km from Lethbridge

A growing community just minutes away from the city of Lethbridge, Coaldale has been working to attract new businesses. The town offers community gardens, excellent schools for the kids, and an overall appreciation for small-town living. The community council invested $5 million into the Northeast Industrial Park and offers a number of attractive business-incentive packages. Beyond the schools, this place is a great option for families with many kid-friendly attractions—the Alberta Birds of Prey Centre and the Gem of the West Museum, for instance.

Photo credit: milosk50/Shutterstock.com

9. BAIE-SAINT-PAUL, QC

Population: 7,146
Lowest cost for gigabit broadband: $79.95
Median income: $30,805
Average rooms per dwelling: 6.1
Affordable housing: 82%
Households with postsecondary certificate: 57%
Employed in arts and culture: 2.9%
Independent coffee shops in town: 6
Access to major city: 93km from Quebec City

Founded in 1678, Baie-Saint-Paul is one of the oldest cities on our list. It's 93 kilometers from Quebec City, in the tourist region of Charlevoix. Baie-Saint-Paul has been a destination for artists for decades, as many pass through to receive inspiration from the breathtaking scenery nearby. The city is home to 30 art galleries, as well as numerous restaurants and shops. Housing is very affordable, with 82% of residents spending less than 30% of their income on their homes.

PIONEER
OLDS

Photo credit: Jeff Whyte/Shutterstock.com

10. OLDS, AB

Population: 9,184
Lowest cost for gigabit broadband: $99
Median income: $37,910
Average rooms per dwelling: 6.8
Affordable housing: 79%
Households with postsecondary certificate: 50%
Employed in arts and culture: 2.7%
Independent coffee shops in town: 2
Access to major city: 95km from Calgary

Olds is a little over an hour's drive from Calgary and hosts the famed Olds College. The neighborhoods that surround the town offer a variety of house styles, including mansions and mobile-home parks. According to the rural community’s website, Olds prides itself on championing racial diversity and recognizes that it’s on the traditional territories of the Blackfoot Confederacy, the Tsuut’ina First Nation, and the Stoney Nakoda Nations. Olds has its own fiber internet network called O-Net, which provides gigabit internet speeds for residents and businesses. That said, the lowest price we found for gigabit broadband is $99 (CAD) a month, from Telus.

FEATURES

TechX Awards: The Most Innovative Products and Technologies of CES 2021

BY PCMAG STAFF

CES 2021 gave PCMag editors their first chance to vet candidates for our new Technical Excellence Awards, aka TechX. The award is given to products, concepts, and services we think are going to be game changers in their respective markets. CES has always been a proving ground for new concepts, and even without a trade show floor this year, there were plenty of innovations to be found. Although there were fewer official exhibitors than usual—less than half by some accounts—the vendors that showed up (albeit virtually) came to play.

We found desktops with new form factors; slim, powerful laptops with clever external GPUs; and refrigerators that use UV light to purify water, just to name a few. AMD continued its assault on Intel chip hegemony, and Nvidia strengthened its position in the graphics market. Of course, there were plenty of cool new variations in display technology as well—particularly in the form of LG's rollable smartphone. When (or whether) some of these innovations will actually hit the market is hard to say, but they're undoubtedly pushing the industry forward.

PCMag's TechX awards might have launched at CES, but we'll continue to give them out throughout the year. After all, innovation doesn't stop when the show ends.*—Dan Costa*

AMD RYZEN 5000 "CEZANNE" MOBILE CPUS

High-performance CPUs for laptops have long been the near-exclusive stomping grounds of chip giant Intel, but that's been changing over the past year. At CES 2021, AMD teased a total of 13 new chip variants that will join the Ryzen 5000 series this year to power laptops of all types: U-series chips for thin-and-light laptops, and HX-, HS-, and H-series chips for more power-minded models.

Then there's the special cable connection between the eGPU and the laptop. Asus' proprietary port and connector will hopefully mitigate performance loss over the connection compared with Thunderbolt eGPU solutions, maximizing your frame rates. This one-two punch could change how we think about eGPUs and make more light laptops truly gaming-capable, with this trailblazer leading the way.—*Matthew Buzzi*

ASUS ZENBOOK DUO 14 (2021)

The ZenBook Duo 14 isn't the first dual-screen laptop or even the first 14-inch ZenBook Duo. But that doesn't make it any less impressive. Asus is building on this future-is-now laptop's twin-display foundation with newer components, improved features, and a slimmer chassis than before. There's no denying that this machine is simply cool, and it's impressively compact at 0.7 by 12.7 by 8.7 inches and 3.5 pounds.

Compared with the original, the 2021 model is trimmer, the screens are brighter, and the second (ScreenPad Plus) display is more advanced. The smaller touch screen includes customizable hotkeys in its launcher to make it more accessible, including shortcuts, quick settings, screen swap, handwriting mode, and more. A major inclusion here is a customizable software ScreenPad control panel for the most popular Adobe software, helping you improve your workflow with a persistent menu of shortcuts and tools to tap quickly.

ASUS ZenBook
PC

A second screen isn't essential, exactly, but as with a second desktop monitor, it can amp up your productivity. This is certainly the best twin-screen implementation we've seen on a laptop this small, on both a functional and aesthetic level, and a model for others to follow.—*MB*

KINGSTON "GHOST TREE" NVME M.2 SSD

While we don't know a whole lot about Kingston's upcoming "Ghost Tree" SSD just yet, what we have seen is killer: It promises new peak raw-speed limits in the world of consumer PCI Express NVMe drives. Kingston says Ghost Tree is capable of hitting up to 7,000MBps in real-world read-and-write scenarios, a new all-time record (if it bears out in testing, of course). Ghost Tree is an M.2 drive that works on the PCI Express 4.0 bus, which means you'll need a very late-model AMD AM4 or spanking-new Intel LGA1200 motherboard that supports the 4.0 spec to take advantage of the peak speeds.

Kingston notes that Ghost Tree SSDs should launch at capacities of 1TB to 4TB, allowing for a range of needs in a boot or secondary drive. Now, the real test of an SSD in the minds of many productivity-minded users and gamers are the 4K random read/write speeds rather than theoretical max sequential speeds, but we'll just have to see how Ghost Tree performs once we put it through its paces at PC Labs. Early claims make it look like a pace-setter, though.—*Chris Stobing*

Kingston
Kingston
GHOST:TREE
Kingston
NV1

LENOVO YOGA AIO 7

Content creators, take note: Lenovo's latest all-in-one desktop PC features a pivot point behind the display that rotates it to portrait mode. According to Lenovo, you can "effortlessly swivel" the 27-inch display of the new Yoga AIO 7 with the push of a finger. Once the monitor changes into a vertical orientation, your desktop screen automatically adapts to fit the new display format.

MODERN ARCHITECTURE
Lenovo
Lenovo

The display has a crisp 4K resolution and can show 99% of the DCI-P3 color gamut. Inside, the desktop can be configured with up to AMD's Ryzen 7 4800H processor and an Nvidia GeForce RTX 2060 GPU. Lenovo plans on selling the all-in-one in the US later this year, with configurations starting at $1,599. In a category that seldom sees much in the way of innovation, the Yoga AIO 7 is the first rethink of the AIO desktop in some time.—*TB*

LG INSTAVIEW DOOR-IN-DOOR SIDE-BY-SIDE REFRIGERATOR WITH UVNANO

Since the COVID-19 pandemic hit, a flood of ultraviolet disinfecting products have hit the market, and LG is now using the technology to keep the water from your refrigerator's built-in dispenser free of germs. The company's InstaView Door-in-Door Side-by-Side Refrigerator With UVnano uses ultraviolet LED light to "virtually eliminate" bacteria on the nozzle. LG says its UVnano technology operates once every hour to remove "up to 99.9 percent of bacteria" such as E. coli, staph, and pseudomonas aeruginosa (which can cause pneumonia) on the refrigerator's dispenser tap.

UVnano
UVnano

It’s unclear whether the technology is effective against COVID-19, but it still offers greater peace of mind that the water from your refrigerator is safe to drink. LG said it plans to announce pricing and availability details in the coming months.—*Angela Moscaritolo*

LG ROLLABLE

Foldable phones are, apparently, so 2020. At CES this year, LG briefly showed off its upcoming rollable phone, aptly named the LG Rollable. No, it doesn’t roll up into a tube; rather, it starts out as a standard-sized phone, and then the screen appears to s-t-r-e-t-c-h into becoming a tablet.

TCL has shown a similar concept, but LG’s is much closer to market—we’ve heard it may appear on shelves as soon as March. As LG is still the third-most-popular phone maker in the US, that sets up a battle between the Rollable and Samsung’s various folding models.—*Sascha Segan*

More to Explore
LG Rollable™

NOOPL

Hearing aids are wildly expensive, so audio-accessibility technology that uses gadgets you already have can be a godsend. Even if you don't have hearing loss, it can be difficult to differentiate sounds in a loud environment.

The Noopl is a directional microphone with software that works with an iPhone and AirPods Pro to give you directionally assisted hearing, cutting through background noise to give you clearer sound from someone sitting across a table in a noisy restaurant or a friend in a crowd. At $199, this could seriously reduce the instances of "what did you say?" once we get together again.—*SS*

NVIDIA GEFORCE RTX 30-SERIES

Nvidia is coming off an absolutely banner year, with 2020 seeing the release of four new discrete desktop GPUs (almost all of which earned an Editors' Choice award from us). And 2021 is kicking off strong with the announcement of the $329 GeForce RTX 3060 in desktop-card form.

Now the company is filling out the mobile segment with the launch of over 70 laptops with GeForce RTX 30-Series “Ampere”-architecture mobile GPUs inside. Nvidia says the mobile version of its RTX 3060 is up to 1.3 times faster than a PlayStation 5, though considering that models with the RTX 3060 will start at $999, the $499 price of the PS5 might look more tenable.

Nvidia will launch its mobile series at three different tiers with the RTX 3060, RTX 3070, and RTX 3080 releasing in both Max-Q and non-Max-Q configurations starting on January 26. If, as with the previous generation, the performance of the mobile versions roughly parallels that of the desktop ones, they will make high-frame rate, high-refresh gaming the norm rather than the exception in gaming laptops.—*CS*

RAZER ‘PROJECT HAZEL’ N95 MASK

Razer’s prototype Project Hazel mask might be the most 2021 tech concept out there. It’s a facial covering that adds RGB lighting with 16.8 million colors, a built-in microphone, and speakers, so you can be better heard. It also has a transparent plastic surface that allows people to see you smile or laugh even when you’re covered up. There’s even some interior lighting inside the mask that automatically activates in the dark.

The mask isn’t designed just to look cool. Project Hazel has also been outfitted with N95-medical grade respirators and special Smart Pods designed to regulate air flow and filter out airborne germs. The ventilators on the mask can also be pulled out and “recharged” by placing them inside a bundled wireless fast charging box, which will also disinfect them with UV light. The only question is: Will it keep your glasses from fogging up?—*Michael Kan*

TCL NXTPAPER

The dream of a color, E Ink-like screen may finally become real this year with TCL's new transflective NXTPaper tablet. Transflective screens are much more restful on the eyes than standard LCDs and OLEDs, but attempts at getting them into color with decent frame rates, cost, and scale have been rocky.

TCL's NXTPaper may be the answer: It's an 8.8-inch tablet with a 60Hz refresh rate and a color screen that's genuinely restful on the eyes, for what's expected to be a relatively affordable price. We wouldn't be surprised if TCL is already taking calls from Amazon about the screen technology.—*SS*

TOTO WELLNESS TOILET

You might already track your activity, food intake, and sleep, but what about your digestion? If you're struggling in the bathroom, the Toto Wellness Toilet might be able to help. When you sit down on this smart throne, it scans your body—and your stool—to determine whether you're healthy. After analyzing your poop, it offers recommendations such as dietary changes to help improve your digestion, via a companion mobile app.

This health-tracking approach is unconventional but convenient, as it doesn't require you to wear anything or change your daily routine. The Toto Wellness Toilet is just a concept product at this point, but it could hit the consumer market in the next few years.—*AM*

How to Secure Your Kid's iPhone

BY TERRANCE GAINES

Photo credit: Thomas Barwick/Getty Images

You can do just about anything with a smartphone. So Apple has baked a number of security features into the iPhone and iOS to keep its users and their data as safe as possible when they're interacting with the digital world.

If you're concerned about your kids' safety, security, and privacy, here are some security features and configurations to consider if you've entrusted them with an iPhone.

SET PASSCODES

Secure Your Kid's Apple ID

The first line of defense when it comes to device security is the passcode. When you hand your of-age kid an iPhone, they will need to create an Apple ID that connects it to Apple's services and a passcode in order to access the iPhone.

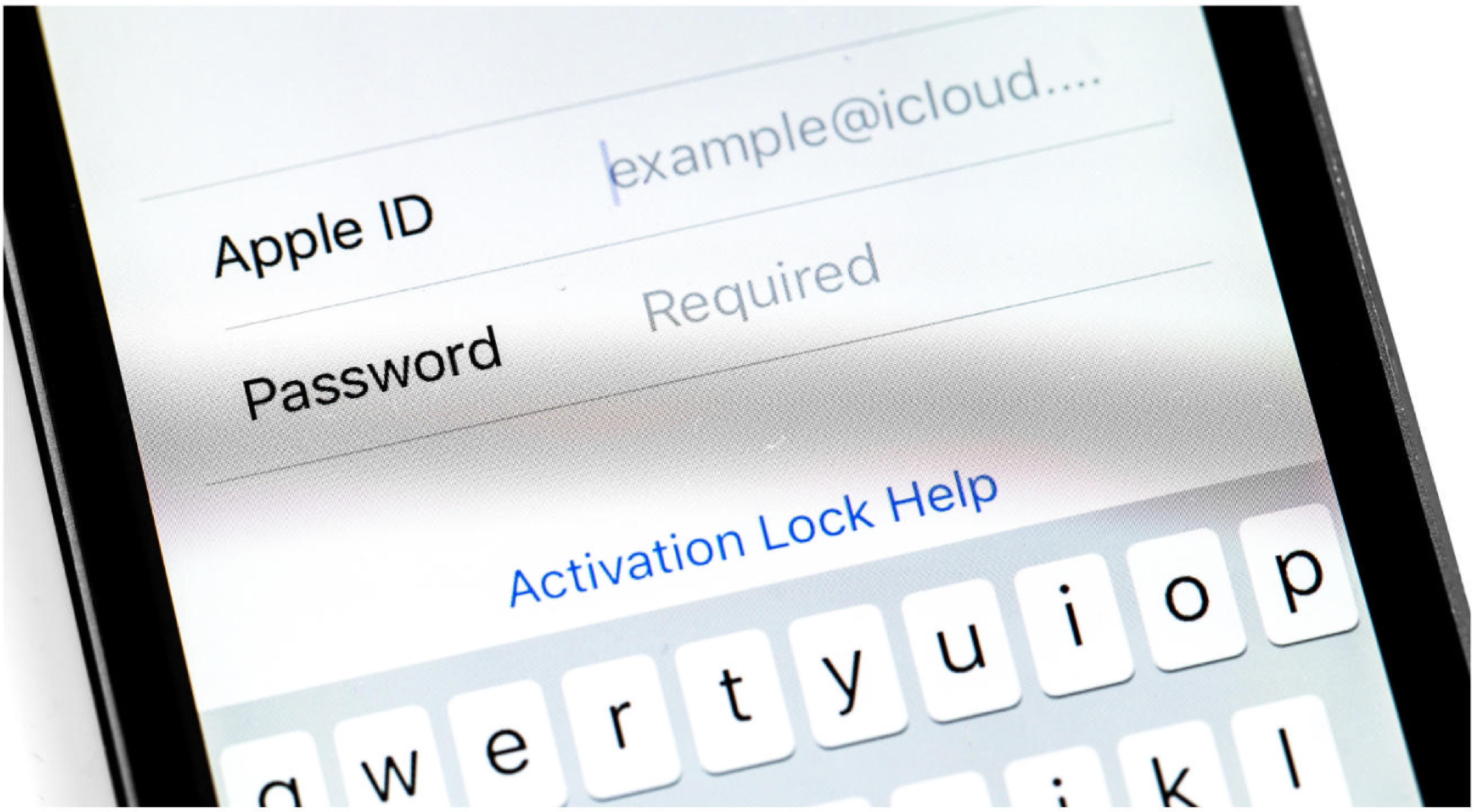


Photo credit: Primakov/shutterstock.com

Create a strong Apple ID password with a combination of letters (upper and lowercase), numbers, and special characters. The more complex your passwords, the harder they are for hackers to crack. That could also make them harder for you to remember, though, so check reviews at PCMag.com and get a good password manager program.

An extra security step is to enable Two-Factor Authentication for your kid's Apple ID, which requires additional credentials when accessing the account from a trusted device or via the web. This ensures that the account is protected even if somebody else has the account password.

Turn it on via **Settings > [tap account at top] > Password & Security > Two-Factor Authentication**. Then, when your kid signs into their account for the first time on a new device or with a new password, they'll enter the password and a six-digit code displayed on a trusted device or sent to a phone number. Note that once two-factor authentication is enabled, you can turn it off only within two weeks of activating it. After that, two-factor is there to stay.

You can add your number as an additional trusted phone number to serve as a backup because, well...kids. **Open Settings > [tap account at top] > Password & Security**. Under Trusted Phone Number, tap **Edit > Add a Trusted Phone Number**.

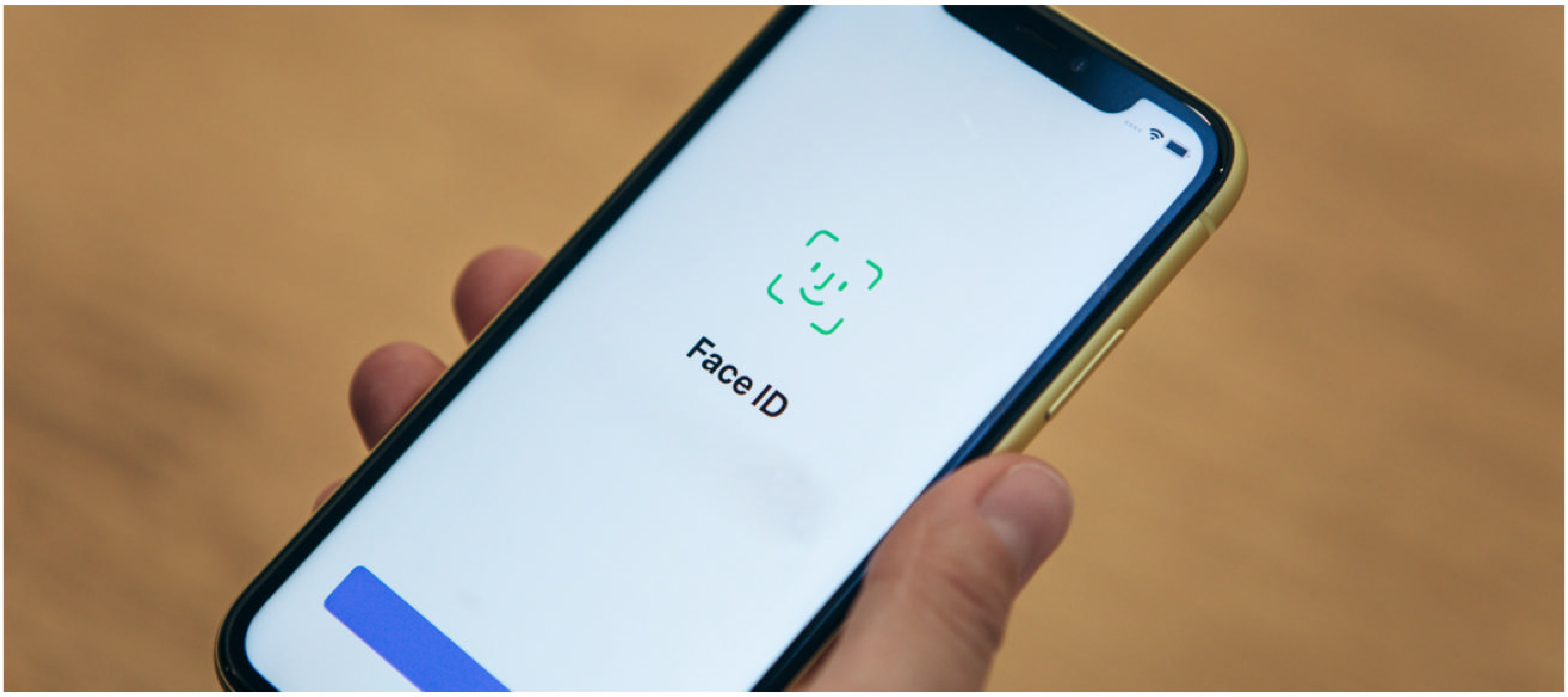


Photo credit: Franz12/shutterstock.com

Secure the Phone Itself

The next step is to create a passcode to access your kid's iPhone itself. A six-digit passcode is suggested by default by Apple, but you can set a longer, more complex, or (dare I say it) shorter passcode. Work with your kid to pick a passcode that's safe but not intimidating. Navigate to **Settings > Touch/Face ID and Passcode > [enter passcode]**, where you can set up a passcode, change an existing one, or turn the passcode off (not recommended).

In addition to a passcode, newer iPhones offer the option to add either Touch ID (fingerprint) or Face ID (face scan) that's personal to the user, which makes the device more secure and faster to access versus entering a passcode in certain cases (thanks, pandemic).

With a passcode and Touch/Face ID enabled, your kid's iPhone is inaccessible without the proper credentials, but some data can be accessed while the phone is locked, like Siri, Notification Center, Wallet, and Message replies, which can contain sensitive information. To view/hide these features, go into **Settings > Touch/Face ID and Passcode > [enter passcode]**. Under **Allow Access When Locked**, enable/disable the features you feel comfortable being accessible or visible when the iPhone is locked.

Now that the Apple ID/password and iPhone passcode is set, keep track of these credentials, because it's pointless to set this all up for your kid only to have them forget the credentials. Again, a solid password manager can get the job done.

13:00
Screen Time
Last 7 Days
2h 50m per day
84 % from last week
T
F
S
S
M
T
W
Games
5h 40m
Social Networking
3h 2m
Creativity
1h 13m
Weekly Total
19h 53m
MOST USED
SHOW APPS & WEBSITES
Games
5h 40m
Social Networking
3h 2m
Creativity
1h 13m
Other
1h 2m
Entertainment
54m
Reading & Reference
25m
Productivity
17m
Show More

Photo credit: Cristian Dina/shutterstock.com

SCREEN TIME RESTRICTIONS

When it was introduced in iOS 13, Screen Time offered a way to keep track of how much time you spend on your phone. It lets you set time limits on categories of apps (2 hours per day on social media apps, for example), though the time's up alerts are easy to swipe away and ignore.

Apple has since stepped up its Screen Time security measures. Parents can control who their children communicate with and what apps they have access to, as well as manage the overall type of content that appears on their devices.

Open **Settings > Screen Time**. Here, you can set up App Limits, Communication Limits, as well as Content & Privacy Restrictions. Tap **Use Screen Time Passcode** to require a code in order to swipe away time-limit alerts so your kid can't usurp your digital authority.

When you've enabled Apple Family Sharing, you can set up Screen Time for your kid from your own device. Family Sharing also lets "organizers" share app and in-app purchases/subscriptions with family members, as well as require certain family members to be granted permission before they can download apps or make in-app purchases.

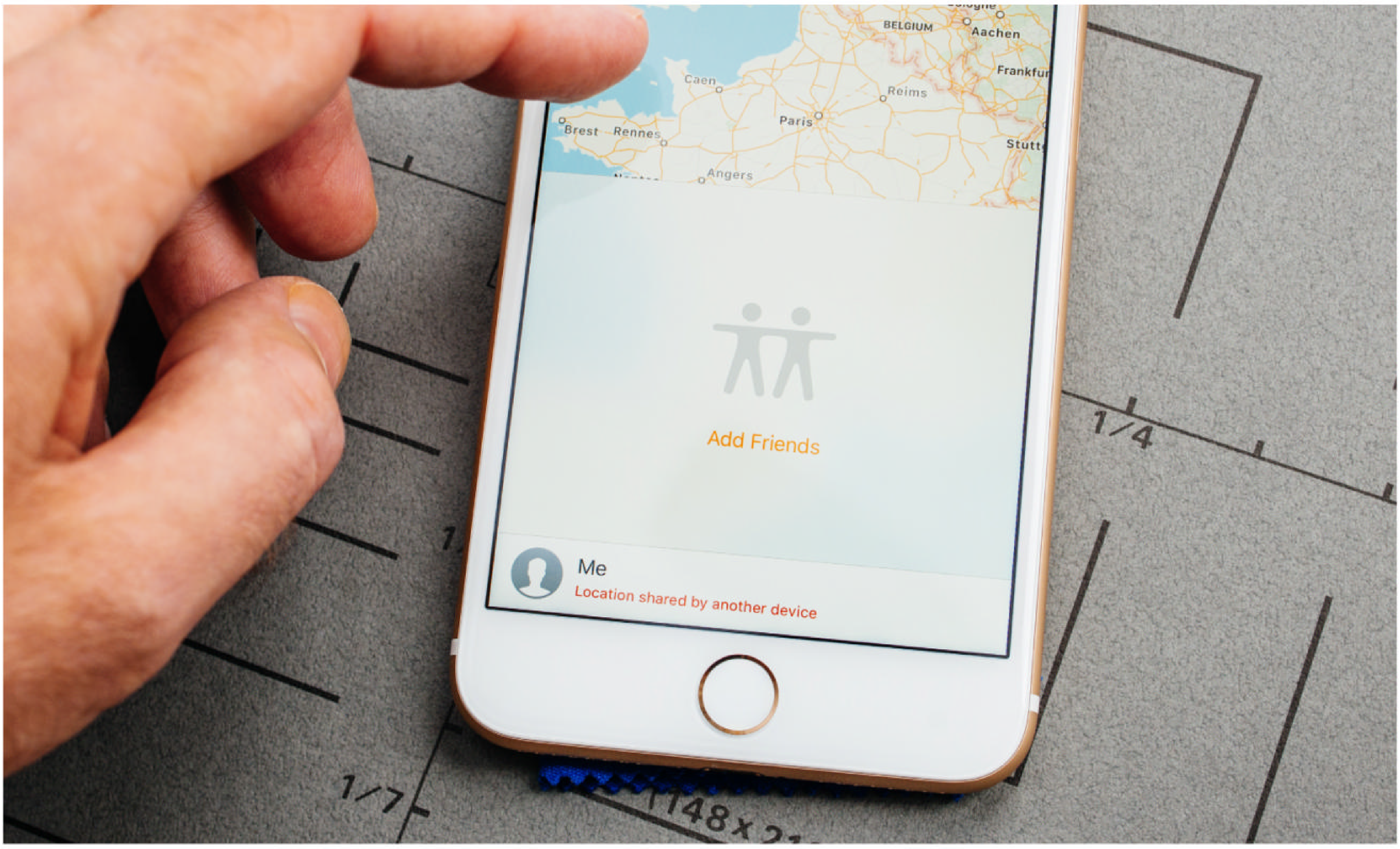


Photo credit: Hadrian/shutterstock.com

LOCATION SERVICES

Setting up Family Sharing also makes it easier for an Organizer or a Parent/Guardian to keep track of their kid's whereabouts after enabling location sharing in the Find My feature, Apple's device-location service. Open **Settings > [tap account at top] > Find My > Share My Location** and turn it on.

Once enabled, a Family Sharing Organizer or Parent/Guardian can view the location of all family members' devices from the Find My app without your kid individually sharing their location to each family member.

Now that you've established who can track your kid's device location, it's time to decide which apps and services should not be tracking their device location. Unfortunately, you can't use Screen Time or Family Sharing to adjust or manage this; you'll have to comb through certain location settings manually on your kid's device.

Start at Location Services, where you can decide if you want Apple or third-party apps to track your kid's location history in order to provide location-relevant information. According to these services, location history will provide a "better overall experience," but you may also want to block it at the start, then slowly allow services based on your comfort level.

Open **Settings > Privacy > Location Services**. Shut off Location services completely, or allow or deny select apps to have access to your kid's device location. Note: If you turn off Location services, personalized location settings set up in Family Sharing and Find My will be temporarily restored if your kid's phone is put in Lost Mode because, well...kids.

When you enable Location Services, you can customize location settings for each app installed on your kid's device. Within Location Services, tapping on an individual app will give you the ability to choose when an app can know the device location (Never, Ask Next Time, While Using the App, Always), as well as enable/disable Precise Location tracking. For example, if your kid is old enough to use ride-sharing services, you may want to enable Precise Location for Lyft and Uber, which will provide an approximate location in order for your kid to use the app properly.

BROWSER SETTINGS

The final place you should secure is the browser, where kids will also spend a bunch of time. You may have already adjusted some content settings with the Screen Time service, but you can dig deeper by going into Safari's privacy and security settings.

Open **Settings > Safari**, and under Privacy & Security, you can adjust settings including alerting your kid whether a site they are attempting to visit has been suspected of phishing (using fake websites or tools to get users to reveal personal information) because, well... you know the rest.

> **The final place you should secure is the browser, where kids will also spend a bunch of time.**

How to Transfer Your Facebook Photos and Videos to Another Service

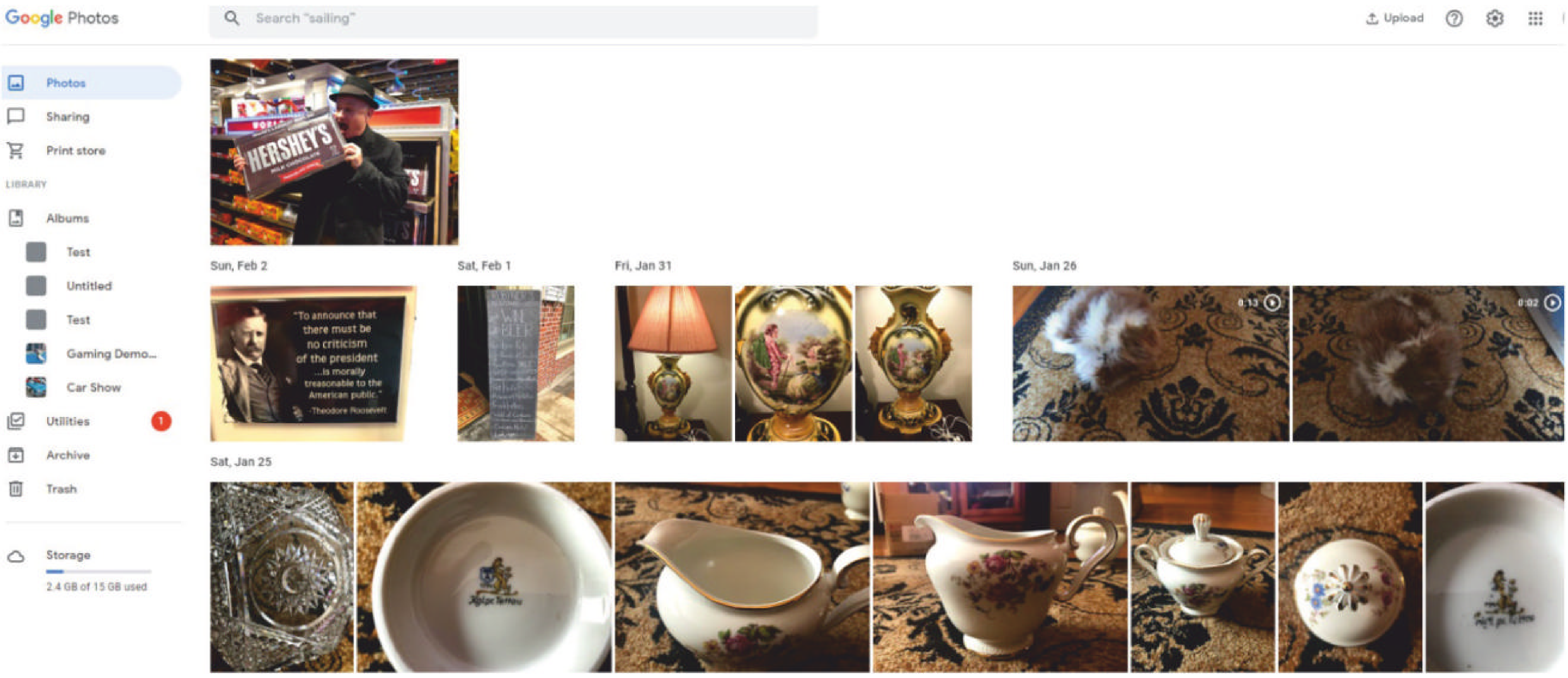
BY LANCE WHITNEY

12:44
Phone number or email address
Password
Log In
Forgotten Password?
Back
OR
Create New Account

Photo credit: New Africa/sutterstock.com

There's a good chance you've posted a lot of photos and videos on Facebook over the years. If you want to export those files from the social network and import them to another program, a built-in Facebook tool helps you easily transfer your photos and videos to any of four external services: Google Photos, Dropbox, Koofr, and Backblaze B2.

By housing your files in one of these other services, you can view them on any device and download them directly to your computer or mobile phone. Let's look at each option.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Search "sailing"
Upload
Photos
Sharing
Print store
LIBRARY
Albums
Test
Untitled
Test
Gaming Demo...
Car Show
Utilities
1
Archive
Trash
Storage
2.4 GB of 15 GB used
Sun, Feb 2
Sat, Feb 1
Fri, Jan 31
Sun, Jan 26
0:13
0:02
Sat, Jan 25

GOOGLE PHOTOS

To use Google Photos, you'll need a Google Account. Most Android devices already come with Google Photos built in, but you can grab the app from Google Play if needed. iPhone users can download it from Apple's App Store. Whether you're in the app or on the web, Google Photos allows you to view images by photos and album, or by ones suggested for you. Open Google Photos to see what photos and videos are already stored there.

Transferring your photos and videos works the same from the Facebook website and app, though the initial steps to access the feature differ. On the web, click the down arrow in the upper right and select Settings. From the app, click the hamburger icon in the upper or lower right and select **Settings & Privacy > Settings**.

> **By housing your files in one of these other services, you can view them on any device and download them directly.**

At the Settings screen, go to **Your Facebook Information > Transfer a Copy of Your Photos or Videos**. Enter your Facebook password at the next screen and click Continue.

At the screen to Transfer a Copy of Your Photos or Videos, click the drop-down button under Choose Destination and select Google Photos.

Choose whether you want to transfer your photos or your videos. Click Next and then choose the Google Account you wish to use (if you have more than one). Sign in if prompted. The first time you do this, you'll have to grant Facebook access to your Google Photos library. Click Allow.

You're then taken back to Facebook and asked to confirm the transfer. Click Confirm Transfer to continue.

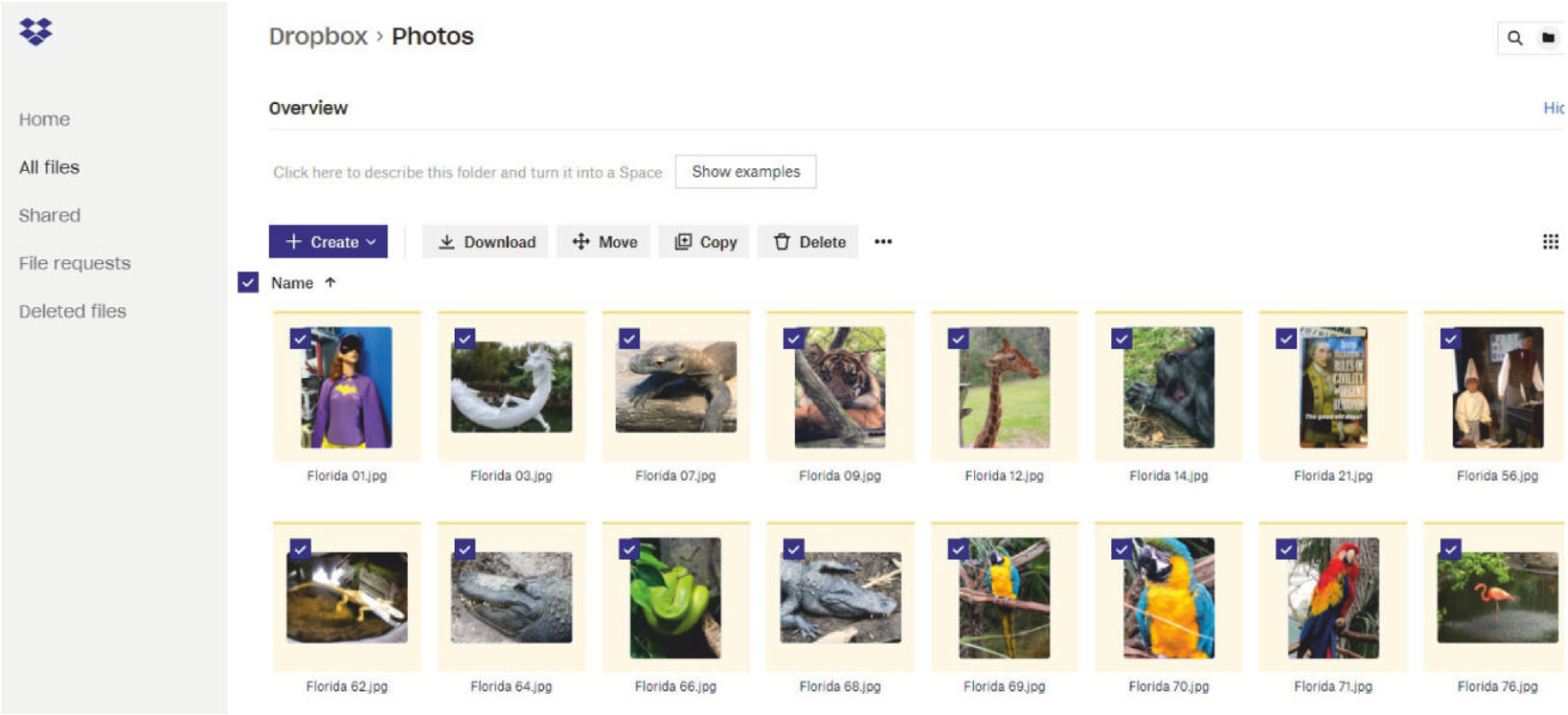
The transfer of your photos or videos kicks off. At the same time, you'll receive an email confirming the transfer. If you wish to stop the transfer for any reason, click the Stop button. Otherwise, just hang tight and let it continue. After the process finishes, a notice appears in Facebook, and the status changes to Completed.

Open your Google Photos page and you should now see the photos or videos that have been transferred. Once your photos or videos are transferred, you can repeat the process to move the other set of files. So if you transferred your photos, you can then transfer your videos, or vice versa.

DROPBOX

Sign into your Dropbox account to view any existing photos and videos already stored there.

Next, go to Facebook and repeat the steps to transfer your photos or videos, but this time select Dropbox.


Dropbox › Photos
Home
All files
Shared
File requests
Deleted files
Overview
Click here to describe this folder and turn it into a Space
Show examples
+ Create
Download
Move
Copy
Delete
Name
Florida 01.jpg
Florida 03.jpg
Florida 07.jpg
Florida 09.jpg
Florida 12.jpg
Florida 14.jpg
Florida 21.jpg
Florida 56.jpg
Florida 62.jpg
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Florida 66.jpg
Florida 68.jpg
Florida 69.jpg
Florida 70.jpg
Florida 71.jpg
Florida 76.jpg

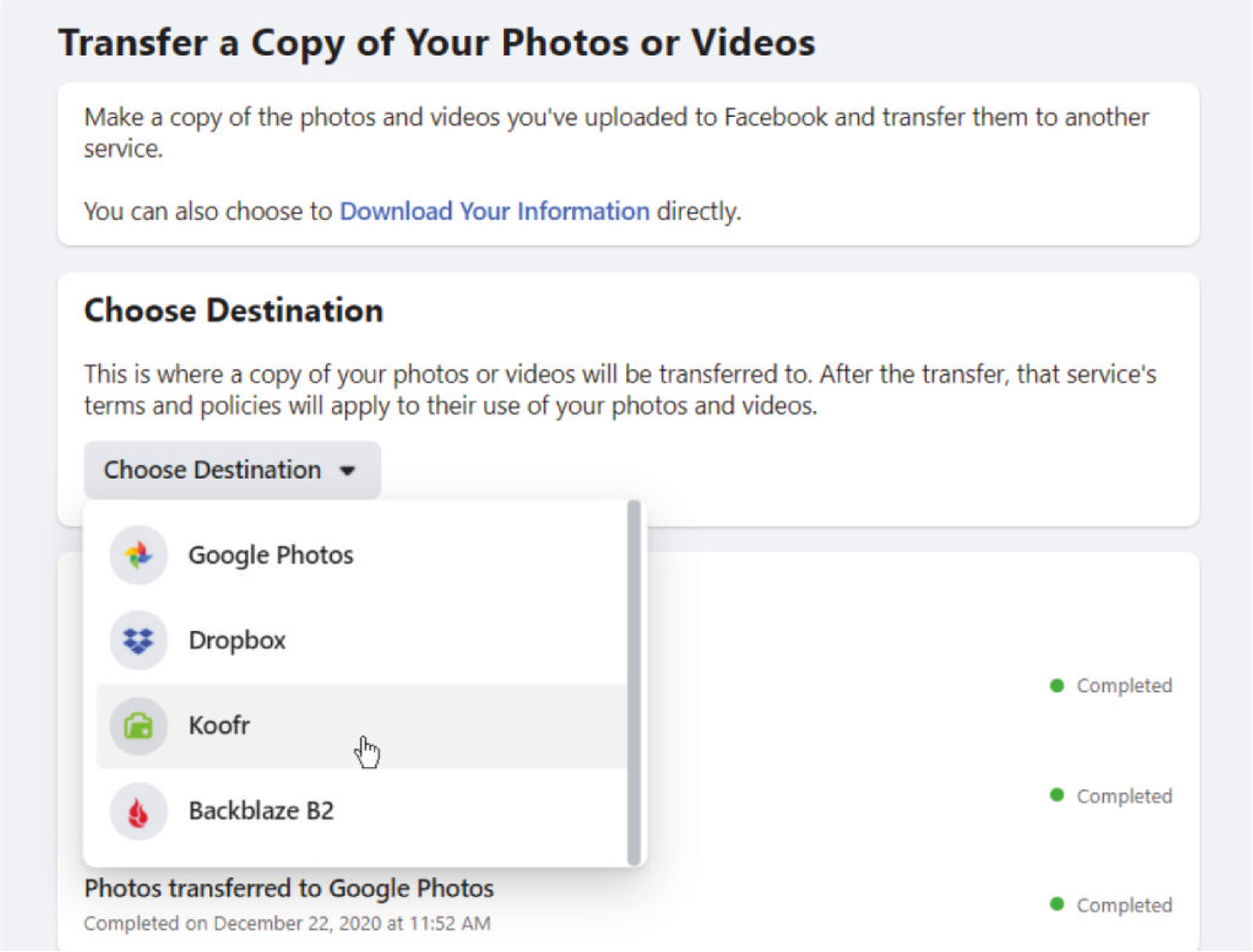
Choose whether to transfer photos or videos. Sign into your Dropbox account if prompted and select Allow to give Facebook the necessary permissions for Dropbox. Confirm the transfer.

Go back to Dropbox. Open a folder called Apps and then a subfolder called Facebook Data Transfer and look for your transferred photos or videos.

KOOFR

Although it's not as well known as services such as Google Photos and Dropbox, Koofr is a file storage service based in Europe and available around the world. It gives you 2GB of storage for free, with the ability to get more by referring friends to the service and by upgrading to any of the many paid tiers. As a bonus, Koofr allows you to store up to 15GB of Facebook photos and videos beyond your account quota. To get started, after you've set up an account on Koofr, return to Facebook, go through the transfer process again, and select Koofr as the destination.

Sign into your Koofr account if prompted. Allow the necessary permissions and click the Confirm Transfer button. Wait for the transfer to complete. Go back to Koofr and open a folder called Data Transfer. Check for the transferred photos or videos in that folder.



Transfer a Copy of Your Photos or Videos

Make a copy of the photos and videos you've uploaded to Facebook and transfer them to another service.

You can also choose to Download Your Information directly.

Choose Destination

This is where a copy of your photos or videos will be transferred to. After the transfer, that service's terms and policies will apply to their use of your photos and videos.

Photos transferred to Google Photos

Completed on December 22, 2020 at 11:52 AM

BACKBLAZE B2

Backblaze B2 is an enterprise-grade file storage and backup service designed for businesses but also available to individual consumers. The first 10GB of storage are free. If you need more, you pay as you go depending on the amount of data you upload, both initially and on a monthly basis. After creating an account, you'll need to create a bucket to serve as a container for your online files. Then, return to Facebook for the photo and video transfer and choose Backblaze B2 as the destination.

At the next screen, enter the Key ID and Application Key created from your Backblaze B2 account. You'll find those at the App Key section at your Backblaze account page. Click Next and then confirm the transfer.

After the transfer is complete, return to your Backblaze B2 account page. Click the entry for Browse files, select your bucket, and then look for a folder named "facebook-data-transfer-XXXXXXXX" with the eight X characters replaced by a sequence of numbers. Open that folder to a subfolder called Photo Transfer or Video Transfer to see the transferred files.

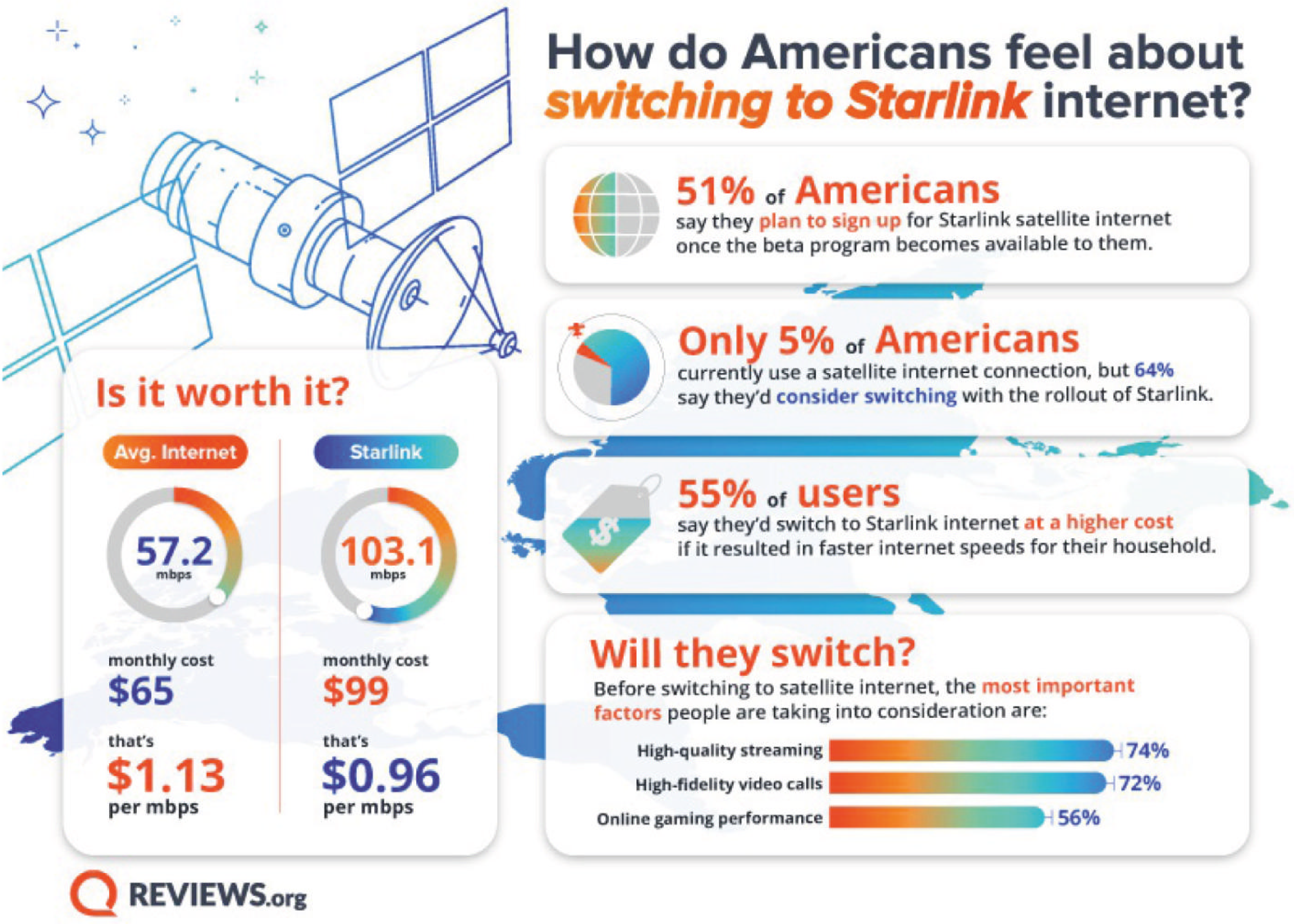
Finally, you can opt to download your Facebook photos and videos to your computer instead of transferring them to another online service. You can then store them and upload them anywhere you wish. To do this on Facebook, return to the page to Transfer a Copy of Your Photos or Videos. Click the link at the top that says Download Your Information.

At the next screen, confirm that the option for your photos and videos is the only one checked. Review the criteria at the top to select a specific date range if necessary, the format (HTML is the default), and the quality (High, Medium, or Low). Click the button to Create File.

After the files have been generated, click the heading for Available Copies and then click the Download button. Save the generated ZIP file to your computer. Unzip the file. Open the extracted index.html file to see thumbnails of the downloaded photos and videos. You can then drill through all the extracted folders to find and view the specific files.

Half of America Is Ready to Switch to Starlink Satellite Internet

BY ERIC GRIFFITH



How do Americans feel about *switching to Starlink* internet?

51% of Americans say they plan to sign up for Starlink satellite internet once the beta program becomes available to them.

Only 5% of Americans currently use a satellite internet connection, but 64% say they'd consider switching with the rollout of Starlink.

55% of users say they'd switch to Starlink internet at a higher cost if it resulted in faster internet speeds for their household.

Will they switch?

Before switching to satellite internet, the most important factors people are taking into consideration are:

High-quality streaming 74%
High-fidelity video calls 72%
Online gaming performance 56%
Is it worth it?
Avg. Internet
Starlink
57.2 mbps
103.1 mbps
monthly cost $65
monthly cost $99
that's $1.13 per mbps
that's $0.96 per mbps
REVIEWS.org

Chances are good that you hate your internet provider, even if your connection is fast. Now imagine your provider can barely give you reasonable speed for your distance-learning kids, your forced-to-work-from-home partner, or yourself for classes, video meetings, and streaming *The Expanse*. That's the state of the internet for far too many, especially in rural areas, and the only reasonable solution on the horizon is the promise of truly fast connections via satellite. That's coming, thanks to Amazon's eventual Project Kuiper (allegedly with speeds up to 400Mbps) and SpaceX's Starlink. The latter is right around the corner from a real launch (we hope) in 2021.

Starlink buzz is strong enough that Reviews.org did a survey of 500 people over age 18 to ask whether they'd consider getting on board. Despite the cost ($499 for an antenna and router, plus $99 a month), over half of those surveyed said they're ready to sign up for the beta program, and 55% who don't use satellite now would stick with Starlink permanently if the connection speed was faster—even if it was more expensive than what they currently have. Forty-four percent of all respondents would stick with Starlink if they could make payments on the equipment rather than paying the $499 up front.

The most important decision factors for survey takers? Streaming (74%), video calls (72%), and online gaming (56%).

The average monthly internet price in the US is $65, so Starlink is pricier in that sense. But broken down by price per Mbps, Starlink comes out cheaper—$0.96 per Mbps (currently averaging 104Mbps on downloads) versus $1.13 per Mbps for the competition, on average.

FYI, Starlink's speed eclipses other satellite internet providers in a big way and also lowers latency significantly. That means the quality of the connection is going to be much closer to what you get with cable (but not quite as good as fiber to the home). Current Starlink latency is averaging 39 milliseconds.

In a previous PCMag report on the speeds being seen in real-life usage of Starlink tests on Ookla's Speedtest (which is owned by PCMag parent company Ziff Davis), we found average download speed was already increasing, shooting from 33.3Mbps on average last summer to 79.5Mbps downloads as of October 2020. That's more than three times the best download speed you'd ever see from the closest existing satellite internet competitor (Viasat). And don't even get me started about Viasat's latency. If you've got the right equipment, Starlink will even work in cars.

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